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# DATA STATEMENTS

## Reverse Logic

1. (Ed) at Australia's Bicentennial Year, the Aussie companies will use its name as the recent "Which Computer?" show. Eilers and Timmer gave way to floppy and PC's on the "Australian stand."

Despite a local and worldwide reordering for Low Commodore in the Antipodes, Commodore compatible peripherals and software were not in evidence. The Australian Trade Commission was eager to promote the fact that high technology is no stranger to the shores of Oz.

Coming from Down Under it was surprising that one product from hardware solutions, the QCOM Corporate Resource, is listed as an "exposed" technique.

## The Communist Threat

Microsoft's attempt to get Commodore to take over some computer. The release of Term, the first computer game ever to be produced in Russia and marketed as the most sophisticated game ever on the market, particularly in the USA.

At the recent launch members of Microsoft, the Russian Embassy and America's CBS News mingled together in a glitzy atmosphere in Vegas Games. Outside Soviet news. Donald Winson, Microsoft's assistant, that copies quantities of champagne were so hard (and a bottle or two anyway) so that Term could be launched at the true spirit of technological exchange. A statement on the IPAs Government's desire to sell in a market with software sales quotas has not yet been cleared for publication.

Term was created by Alexei Pirovich '89 and the man who presents to Microsoft was Victor Anshin, Head of the Computer Centre of the USSR Academy of Sciences.

The game was first created by Andromeda Software, Robert Jeter of the Computer Research Laboratory in Budapest during a recent visit to Hungary. Improved by the simple administration of the game Steve

## Sticking to Walls

Known the Speed King several companies have moved from their original home in England. Given to larger premises but still in wall space in Wales.

The new letters in Edde Vale was opened by the Rt Hon Secretary of State for Wales, Peter Walker, at the presence of the Rt Hon Michael Foot MP for Blaenau Gwent and other leaders (and dignitaries including the Mayor of Blaenau Gwent).

Kenny, Llanelli, export 90% of their products and have just signed an agreement with local one of the largest computer peripheral manufacturers in the US for the distribution rights to their products in Georgia.

The move to the larger premises will enable Kenny to employ a further

100 people which is welcome news for the growth of South Wales.

In his opening Peter Walker mentioned "I am delighted that this company with such high technology has conquered world markets, applying up to date technology coupled with an enthusiastic labour force. I am sure the company will have numerous export worldwide in years to come." Speaking on behalf of his constituency, Michael Foot added "I'm thrilled to see what has happened here for Kenny and I'm sure the company has a wonderful future which is good news for all of us."

## Findings

Kenny Products Ltd 17 Avenue Industrial Estate, Edde Vale, Gwent NP23 5SD Tel 0493 761611



Steve Williams (left) Kenny, Llanelli, exports 90% of their goods to Peter Jeter of CBS and Michael Foot.

showed it to Microsoft who immediately snapped up the publishing rights.

The game is an enhanced form of the original PC game programmed by Yegor Gerasimov of Moscow University. In addition to a high resolution backdrop, the 25 minute musical accompaniment was

programmed to by Hagar, a regular contributor to Computer's growing bank of musical talent.

## Findings

Microsoft Ltd 1000 Ave. 9<sup>th</sup> Ste East, Redmond, WA 98073 Tel 206 882 8000

## DATA STATEMENTS

## Barrett's New Home

The arrival of 11 September has a marketing message among Commodore's employees at Atari's offices in Los Angeles. At that time, the appointment of Dean Barrett, Barrett was previously employed by PR consultants Barton Curran Duncan on their Commodore account. Naturally, this placed Barrett in an ideal position to move across to his new job.

Commodore's managing director, Neil Franklin comments: "Dean has proved himself over the past six months handling our account at BDD not just as a professional PR man but as a valuable member of our sales and marketing team. He knows the business, he knows our dealers and he knows our opinion. I am delighted to welcome him aboard."

Barrett will be responsible for developing dealer and end-user marketing support across both the company and its business divisions. He will also coordinate the activities of Commodore's agencies Mills & Staples (consumer product advertising), Sharp (consumer product advertising) and his old company BDD (corporate and product public relations).

## Teacher

Commodore Business Machines PR Ltd, Commodore Group, The Strathclyde, Glasgow Road, Midlothian, Scots EH1 7LJ. Tel: 0262 710001.

## CIBASIC

Working with third and 4th Gen languages programming can be a problem unless you are BeckerBASIC from Atari.

The extension language adds over 270 new commands and functions to the CIB and GEOS allowing programmers to set up full-down menu-driven forms, window boxes, high resolution graphics and 3D pictures. Special commands are included for video and cursor control, sprite animation, sound and music, development with structured programming, and.

A further enhancement is forthcoming through user defined commands and macros for defining.

Over the address has been taken that can be distributed to other users through a routine facility. BeckerBASIC is compatible with CIB Basic and GEOS Version 1.3.

## Video Movies

Accurate, fast, produced a second color bleed to control images associated with print and graphics to monitor screens.

The bleed can be rolled away to facilitate cleaning of the screen but when in operation it helps to keep the operator clean too!

It takes around 30,000 volts to form a static produced by the screen creates a colour image on the screen and then produces a positive electronic field. The human body is negatively charged so an attraction is set up (you can see this on a bathroom shower when the metal rods are on TV - don't get them too close to the windows of TV retail shops).

Carried along on this flow is all of

the positive electrostatic attraction, especially significant when attracted to your expensive charge.

To combat this effect the new screen filters are coated to reduce the static present when the monitor is in use. Other problems are caused by the new filters such as possible lens-etching glass, and harmful stresses are reduced by a modified mesh.

The shock caused by static build-up is nothing compared to the shock caused by the price - £64.95 to £74.95!

## Teacher

Academy, Super, Home, London Road, Wrexham, North, Shropshire, East, Cheshire, UK. Tel: 0752 827777.



A Commodore monitor system.

## Tragic Loss

It is possible the robot-like, Master of a talented graphic artist and close friend, James Wilson, 20 was tragically drowned in an accident at Lyme Regis, Dorset on Thursday, January 14th.

Wilson was a major contributor to the success of many Code Masters titles through his imaginative graphics. In a recent statement the Darling brothers expressed their

sorrow at his loss and their deep love, friend. Not only was James a professional and pioneering contributor to our company but most importantly he was a very special friend to all the family - we shall miss him tremendously.

Just Commodore would also like to express their deepest sympathy to James' family and all who knew him.

## DATA STATEMENTS

## Code Masters' Simulator

Over a hundred business programmers take a lot of computing, according to Code Masters' David Darling. With an increased output in 1986 programs for the Amiga and Atari ST alongside the new Code Masters Plus range, the need for a full-time publisher's assistance has become essential and the Darling club have no look-in for someone to take on the task. Mark Barwick, programmer of First Mucker Simulator, has been given the demanding job.

Barwick has no limits on the problems and concepts of his commissioned programmers, so his past experience should mean that he is well equipped to tackle the sophisticated new equipment when necessary.

Only one question remains: will the new breed of the Code Masters camp mean that they'll drop their tubes of selling almost every game a something or other Simulator?

## Teacher

**Code Masters' J Business Systems, Code Systems also Reprints, Data OSM 1987**

## Protect the Innocent

Some students are often a little bit being encouraged to consider the implications of the widespread use of databases. British Trade Alphabet cards have been distributed to schools and colleges throughout the United Kingdom to increase awareness of the Data Protection Act 1984.

In a statement on the latest issue Eric Home, Data Protection Registrar said recently: "It is important that young people are made aware of their rights under the Act. It is also useful if they are familiar with the legal obligations of computer users. With automation technology playing an increasingly important role in our daily lives, it is inevitable that a large percentage of students will be working with computers during their careers and will need to know personal data will end up in many data banks."

The release of over 10,000 of the 'trade-alphabet' cards at a rate of one in a growing number of computers for information on the Act from students

## Colour Matrices

The computer's colour system and matrix printer is being upped with an bunch of matrices from Star Jet Colour.

The Star Matrix 80-80C has a built-in Commodore interface and allows a choice of seven colour high density NLQ printing in one of four fonts. The paper can be sheet fed or tractor driven by a push feed system which means cover label and standard form printing. Switching between tractor and sheet feeding is facilitated by a parking system which pulls the tractor paper out of the platen path but allows for automatic refeeding after the sheet run is completed.

The new style Star Jet panel allows direct switching of one of the special NLQ fonts as well as the normal linefeed page feed, headlamp, roll top and power up/downs as well as the new paper parking facility.

The Canon HHP-48 also employs high density NLQ matrices to support an optional extra colour printing capabilities. Only one font is supplied in the standard machine, but this will be expanded by the available plug-in

font printing card. Various matrices are also being developed.

The basic printer comes with colour printing and adds an extra £50 to this. There are no plans for a Commodore interface, but a Commodore connection enables access through a suitable Commodore interface.

Both machines open up the possibilities of colourful graphs and pie charts as well as high resolution screen dumps through a suitable control program.

For those with more modest requirements Epson's LQ580 looks the colour finish, but does provide font expansion through a series of cards for a £65 plus VAT.

## Teacher

**Star Matrices 80-80C/80C, Canon HHP-48, Epson LQ580**

**49 C, Abchurch Lane, Solihull, Warwick CV5 9JF, Tel: 06-179 2290**

**Canon Europe Ltd, Tel: 0997 70077, Agency of RJ Ltd, Davison House, 15 West Road, Buntingford, Suffolk CB11 3JL, Tel: 03-967 9302**



Canon HHP-48 colour printer

and teachers spend down to earth. The cards give a brief introduction about the Act but there is no provision to suggest discussion and a useful questioning strategy to work the way in which databases can be used and the rights which an individual should have to gain access to his file about themselves.

Further information can be obtained from Nigel Waters, the Assistant Data Protection Registrar.

## Teacher

**Office of Data Protection, 1 Grosvenor Place, London, W1A 3AB, Clarendon Chambers, SW1 4AL, Tel: 0925 19177**



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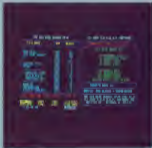
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# THE BIG BLUE READER



By Bill K. ...

*The 1571 disk drive can emulate CP/M drives but its versatility can be stretched even further*

*By Norman Doyle*

**A**s a journalist, I've often asked to supply articles on MS-DOS IBM format disks. This has meant using an IBM compatible running a word processor which has different commands to the one that I normally use. Now, with the Big Blue Reader I can do all my work on its CIBR and create an MS-DOS disk using the original 1571 drive and its customary word processor.

The Big Blue Reader from SONYWAP Inc. has been around for a couple of years, but was not first available in Britain. The early version had a few drive-backs with disks having

to be pre-formatted using a separate program before the Reader was loaded and the program was unable to operate with CP/M program disks. The new CP/M version corrects these failings and adds a few extra improvements into the bargain.

The resolution program is a powerful tool to anyone who has to open formats allowing transfer of files between Commodore DOS, eight sector on one sector MS-DOS and CIBR CP/M diskettes in either single or double sided formats.

Full use is made of the CIBR's memory as a buffer to allow multiple

file transfers and disks can be formatted to Commodore as an MS-DOS specification without having to resort to secondary programs. Added to this the simple, user-friendly menu system and the result is a powerful program with many applications.

Command, and keys to just right allowing any facility to be called up at the touch of a function key or by highlighting one of the menu options using the cursor keys. Load Dir, Copy Type, Update, View Dir, Turn, Data and Disk Costs.

### Load Dir

Execution of this option is met with a secondary disk type menu - Commodore MS-DOS or C128 CP/M. If the computer loads a correctly formatted disk on the drive the menu can be modified back and forth using the cursor keys.

This is a preparatory function which may be called before entering either the Copy or Type options.

### Copy

If a directory has been loaded into the program, any number of files can be selected for copying using the cursor keys to scroll up or down and the RETURN key to make the choice. Selected files are indicated by a reversed asterisk beside the file name and transfer can be completed by entering one of three high-speed file names.

If all the files are to be copied the F1 key enables an "select all" key and the F1 key will cancel all selections.

When the transfer is made, the program asks which of the three formats is to be used for the target disk. It then issues a series of function keys Commodore to MS-DOS, the option to convert from Commodore ASCII to standard ASCII code is offered.

### Type

Any file can be displayed directly to the printer or screen but the results cannot be generated. Sequential text files can be displayed without problems in standard or Commodore ASCII characters but program files can disrupt the meaning of the program.

Text files normally contain acceptable signposts, instructions but when listed Commodore programs file the results, viz, influenced by some of the codes contained. Columns changed, windows were formed and program crashes resulted.

There are two more around this difficulty. The disk contains an executive file utility which can locate file for display via the C128 monitor. There is also a built-in document User Translation Table in the Utility option which should strip non-printable characters from displayed files but its attempts to do so proved fruitless.

### Utilities

These are two utility functions held on the F1/F2 keys. The main one offers three options. The first I have just mentioned, the User Translation Table. The MS-DOS diskette formatter is essential and it's good to see it made the program at all instead of as a separate file. Unfortunately the newly added CP/M formatter is still a separate program.

The final option is a 1271 Speed-Up with double the word verification which normally takes place when saving to a Commodore diskette. Although files grow about 8% larger saving time and is fairly reliable there is the possibility of failure and it only applies to Commodore and CP/M templates.

The second utility is a standard Commodore DOS allowing C128 disk commands to be easily used to the drive.

### Additional keys

Before transferring a file it may be desirable to check what is already available. This could be done through the Disk Command option but a second, separate option is included which also allows the reading of directories from all disk formats.

Time and date options also exist which will label MS-DOS disks or simply give a temporary screen display.

### Conclusions

As a "one-click" program there is no overhead by which to judge the Big Blue Reader's performance. All that can be said is that it does its job admirably and with as little fuss as possible. The functions are basic and I got the feeling that the facilities have been restricted to eight options to comply with the number of function keys available.

The program is noteworthy for those who have a very specialized need such as my own or for those who are currently upgrading files to a newly acquired IBM compatible system.

Devised for a 1271 drive, the program will only run on a 128D as limited which limits its availability to early users. To those with access to a 128D or to the very rare 1271 stand alone drives, this utility is an absolute boon and knowing the capabilities of the excellent 1271, most conversion programs may become available from the States in the near future.

### Final note

Name: The Big Blue Reader, Supplier: Commodore Services, Software, and Plans, database: News, Dr. Murray Street, Harrogate, H.R. 12 9JL, Tel: 01430 517481, Machine: C128 with 1271 drive, Price: £7.95.



# Communications Corner

*Is your hobby as costly as you think? Our intrepid reporter in the world of communications has been finding out*

*By David Janda*

**A**s you I imagine that it rarely occurred when buying camera equipment for a modern software or a subscription in the usual change to your telephone bill as a result of your new hobby. On the one hand it would be unfair to expect the telephone to give you an accurate estimate of how much you will be using that equipment or service, yet on the other hand some of the average prices I have heard quoted to potential customers are ludicrous!

There are three to four areas by which you will have to pay out such as purchasing equipment, cost of phone calls, subscriptions to on-line services (if applicable) and payment for value-added services (one-line charges etc.).

Before I describe each aspect I would like to point out that one of the more common traps the camera amateur falls into is of not budgeting for their hobby. Of course it would be difficult over a period of time, but you'll have to pay up in the end so be prepared!

## Purchasing Equipment

The camera, the modem and software. The first point can be the most critical of them all. Purchasing a model will affect the time spent on-line and the use of local camera software will help you down. There is nothing worse than flipping through dozens of manuals while on-line and the telephone meter ticking. As far as choosing a modem is concerned I would recommend that you purchase one of the more expensive models! Why? Because these

provide higher baud rates such as 1200/17 and 2200/1200 full duplex as do 2400/2400 full duplex such as the Fair Series Four 2400s (£499 + VAT). Higher baud rates means more data going down and up (the phone line per second), and this will reduce the overall time spent on the telephone.

Camera software comes in many guises. The only advice that can be offered is to choose a package that you feel comfortable with. You can save money in the long run by purchasing software that provides some sort of data for in the case of word/data systems, training capture to disk or memory. This will enable you to read the captured material offline thus saving you money.

It is also worth noting that the commercial services such as Microsoft and Compaq offer subscribers various 'packages' which tend to include the modem software and subscription all at a reduced rate which are worth checking out.

One hidden hardware cost that may crop up is that of a telephone extension or even a new line (two-year premium). Should you really get into camera the family may get annoyed with all those wires trailing across the living room floor and you may be tempted to some corner of the house. A telephone extension may be in order and here again you can save money by purchasing approved DIT telephone extensions (not from reputable companies such as Dataphone Ltd for as little as £80 BT will require it for a maximum of £28.75 + VAT for residential customers).

Should you use the phone frequently then you may have to opt for another line into your premises. The initial cost will be £105 + VAT. Then there is the cost of the phone (data) lines, your own - never rent one from BT) and the quarterly rental at £17.95 + VAT.

## Cost of Phone Calls

This is the big one! I have met too many people, who after some time, have taken one look at the phone bill and have subsequently parked their modems in the attic for good! Without a double-line phone bill it's all go up - be prepared for it to double or even triple. This may not be as bad as it sounds. An average quarterly phone bill of say £25 (ex. rental and VAT) going up to £50 may seem a lot but is £80 worth a big deal? Well, to some it is, so again it is best to be prepared. The telephone subscriber has two vital weapons of use either one against the BT phone bill or free booklet from BT and phone directory!

The cost of a call is measured in minutes only. One unit costs 4.4p + VAT totaling 5.0p - remember the figure is a unit! Depending on what time of day you call and what distance that call is as you will be charged a fixed amount of time for each unit. There is a simple formula to remember:

Number of units x 5.0p = cost of call

As an example, I live in north London and wish to make a call to Brighton. There is 5pm on a weekday

The call will be cheap rate (month's Special number's). Next I need to know what charge band Bandson falls in, so looking at my A - B telephone directory I see that the charge band letter is 'A'. A charge rate call in charge band 'A' will give me 180 seconds per minute cost. I make and time the call which lasts 425 seconds and calculate the 180 which gives me 4.25. Ah! We have some extra's a fraction, but all calls are rounded up to the nearest cent so I get a figure of 5. Thus the number of minutes used for the call being the formula mentioned earlier.

5 x 50p = 25 (pence) cost of the call.  
Each and every call that I make is calculated in this way. After a while it becomes second nature. The total cost of the call is written down, including no. of minutes used, and at the end of the day a total is made, which I enter into a book. At the end of a week the daily totals are added up and an appropriate number of telephone stamps are purchased. When the next BT bill arrives you simply gas at the local Post Office.

The calculating and adding down of totals is an application being to be completed.

**Subscriptions**

Subscribing to services such as Microsoft Computer or Microsoft is going to cost you money. The vast majority of services have a quarterly subscription and nearly all require you to subscribe for a minimum of one year.

**Value Added Services**

There is another of those costs which most often goes unnoticed but budgeted for. Under the heading can come text charges, cost of downloading software, playing an on-line adventure game, entering a prize draw or time charges for reading pages of information. These can mount up and are very hard to keep track of. Computer provide these services with a detailed invoice coming every transaction made on the system together with reference number, description and detailed VAT. Has off to Computer!

Praxis/Microsoft on the other hand are terrible in this department. Bills are not itemised and there is no way in which you can verify costs by

looking at the bill. It's a bit like receiving a bill on a restaurant which has just one heading - food's grounds please.

An example of where things can get out of hand is when playing Shred-Microsoft's on-line adventure game. This like many other on-line adventure games is very addictive and players spend a lot of time and money on it. The game is time charged, yet players can only check the total cost of the current session on-line and even this does not include VAT. To make matters worse, areas on Microsoft such as VMS, the on-line magazine and time charged for non-Microsoft subscribers (at the time charge is included in the current total for the on-line session (which is subsequently taken off when the bill is calculated). This makes a mockery of the on-line total, and in all the billing systems employed by Praxis is to put it mildly painful.

By a small lot of on-line systems and by calculating the cost of phone calls, a lot of money can be saved. It has not been my intention to write anything potentially causing modern ears but to highlight some of the costs which in the end you and I have to pay.

LIFESAVERS 8

C64

LIST PAUSE

1/1

The C64 is sadly lacking a pause function that allows you to stop the listing of any program by pressing a certain key.

This routine changes the LIST vectors to point to a new routine. This routine will then check whether a SHIFT, COMMAND or CTRL key has been hit. If so the routine will loop around until the key is released, thus stopping the listing.

Once the key is released the LIST will continue as normal.

A convenient way of stopping the listing for some time is to press the SHIFT LOCK key.

By G Saunders

```

10 REM *****
20 REM LIST PAUSE
30 REM *****
40 HL=1 LN=110 SA=49152
50 FOR L=0 TO HL CX=0:FOR D=0 TO
0 15 READ A,CX=CX+A POKE SA+L*1
60 A=NEXT D
70 READ A IF A<CX THENPRINT"ER
SOR IN LINE";LN+(L*10):STOP
80 NEXT L END
90 DATA 162,11,160,192,142,6,3,
149,7,9,96,72,138,72,152,72,142
8
90 DATA 174,141,2,214,1,176,249
,104,168,104,170,104,78,26,167,
0,1688
100 END 49152 REM START PROG
    
```



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# ULTIMATE



*Are the latest cartridges on the market the ultimate in C64 add-ons?*

*By Stuart Cooke*

**E**ven though the C64 has always had a cartridge port, it is only over the last couple of years that the cartridge market has been getting the attention that it deserves. Unfortunately, for the software industry many of the cartridges developed were designed to enable the user to copy commercial programs.

As time has marched on, more and more cartridges have been developed, each offering more facilities than the last. Now Day! has added two more cartridges to the ranks of over ready programs in the guise of the Final Cartridge III and the Action Replay Mk. IV. Both of these cartridges offer their own facilities for making copies of commercial software. However, both offer the user of these cartridges many more features, making them stand out from others in the market.



Final Cartridge III

Action Replay, Mk. IV



## To Copy Or Not To Copy

Even though many cartridges offer "backup" facilities we must stress that Four Commodore does not combine the copying of software for purposes other than the owner's own use. We do understand the importance of having backups of much used software to guard against accidents. Cartridges that offer copying facilities should be used for just this purpose.

Making backups of programs can also put an accent on loading time. Using the Warp II option of the Action Replay IV cartridge, more of the time, the loading time of my wordprocessor was reduced from 1 minute 45 seconds to just 8, yes 8, seconds, impressive eh?

## The Final Cartridge?

When the original Final Cartridge made its way on to the UK market it proved to be extremely popular. Originally the cartridge added numerous "utility" functions to the C64 which the computer was in need of. DOS functions were added allowing the user to access a directory listing, without having to LOAD it over the program in memory. Basic programmers were given a number of useful commands including a remember, while machine code users were given access to a monitor that wasn't present in the computer memory. The Final Cartridge III offers all of the above facilities and much more. For a start the C64 is given a new Microsoft like, desktop. Full screen menus, windows and icons giving the computer owner access to many facilities via the keyboard, mouse or joystick.

Upon power up the desktop is

# CARTRIDGES?



- 2) Select the operation that you require
- 3) Input any text required, such as new name etc
- 4) Select the DD option to start the command

A newcomer to Commodore computers may find this great, personally I feel that I would enter the secondary commands quicker at the keyboard.

The last desktop option is **CLOCK**. This allows you to set up the time and set an alarm. The time can be displayed at the top right of the desktop bar.

### Basic Plus

As previously mentioned the Final Cartridge III adds a number of extra facilities to Basic, these are: Bi-directional recording of Basic programs, A printer interface, Screen dump facilities, A disk and tape turbo, Pull down menus, 28 new commands, New editing commands.

The new editing commands allow you to jump to the bottom of the screen, delete characters after the cursor to the end of the line and freeze output to the screen - useful with the **LIST** command.

The printer interface mentioned above allows you to connect a top-Commodore printer to the C64 via a Commodore interface.

All of these Basic commands can either be entered directly from the keyboard or selected from a pull-down menu. Obviously space won't allow me to detail all of the commands available so I'll just mention a few: **AUTO** - gives auto line numbering facilities,

**BAR** - allows you to turn on and off the pull down menu,

**APPEND/APPEND** - adds the specified program to the one in memory from either tape or disk,

**DESKTOP** - enters you into the cartridge desktop

**DOS** - allows you to send commands to the disk drive and get directory listings, with ease,

**DUMP** - lets variables used by a program

**FIND** - search program for specified information

**KILL** - disable the cartridge,

**MON** - enter the cartridge monitor,

**RENUM** - renumber a program

**PACK/UNPACK** - compress and

uncompress the program in memory  
**?** - allows you to use a hexadecimal number

### Printer

As I have already mentioned the Final Cartridge III allows you to make backup-copies of programs, - well this is the wisdom of the product that does it, however, it doesn't end there.

Once you have accessed the printer you can manipulate the program in a variety of different ways. Firstly, there is an extremely powerful power dump option that will send a copy of your current screen to the printer. One extremely impressive feature of this screen dump is the fact that not only is the backing up sent to the printer but spaces are also printed. This is the only printer dump that I have come across that does this. It is worth pointing out that due to the complexity of some programs you can't necessarily print out everything.

Clashes are caused for by the ability to disable sprite/palette collision detection and sprite/background collision detection. When playing some games selecting these options will allow you to avoid being killed. A **GAME AUTOFIRE** option transforms your normal pistol into one with auto-fire capability. When you hold down the fire button the weapon keeps firing.

When finished manipulating the program in memory you have the ability to return to the program, run to the desktop or go into the machine code monitor.

### Monitoring

The machine code monitor offers all of the commands that you would expect to find such as assemble, disassemble, memory display etc. A number of other useful commands have also been added that make the monitor extremely powerful. Commands such as edit characters and spaces. These aren't 'real' editors, but allow you to enter a string of " " and " " in the shape of the character or space that you require. A disk monitor allows you to access and modify the internal memory in your disk drive. As well as being able to modify the internal your drive memory facilities even to read errors of the disk in the drive two memory.

### Spended Up

I have already mentioned that the

Final Cartridge III has both a disk and a tape turbo.

To use the tape turbo you simply **LOAD** and **SAVE** programs with a device number of Tencher (don't mess it out of using 1. The tape turbo is around ten times faster.

The disk turbo is automatically used with any disk command. The improvement on loading speed is around 15 times. It is worth pointing out that if a program is protected then not all of it will be loaded at turbo speed. Though this can be overcome by freezing the program. In my own tests I found that my wordprocessor actually loaded slower when the Final Cartridge III was enabled than the same program did when the cartridge wasn't present - and that program doesn't have its own turbo.

### Final Cartridge?

There can be no denying that the Final Cartridge III has some extremely powerful and useful facilities. My overview of what the Basic, utility commands and screen dump facilities are covered but that the desktop facilities, though extremely good, are generally not options using the cartridge will soon get fed up of using many of the facilities offered. The idea of having a non-trap facility permanently available was extremely appealing to me as I would use it for writing quick macros and taking telephone messages however when you move from Basic to the desktop any program in Basic memory is lost. In other words you have to **SAVE** your programs before accessing the desktop. In my mind the maker's options such as the non-trap and calculator are a nice touch you can't think between them and your program.

So would this cartridge be my Final one? Well to be honest it's a good bet it's not that good.

### Action Replay

Reading letters in our Commodore is sometimes seems that the Action Replay cartridge is appended, re-released every month in fact the review re-generation is only number four and is the most comprehensive to be date.

So much is packed into this cartridge that Dandel had a custom LSI logic chip designed by Motorola for the cartridge. As well as this there is also 32k of ROM and 8k of RAM inside the small red box that plugs into the cartridge port.

## Back Again

As with all of the previous Action Replay cartridges the emphasis at this one is the ability to backup programs. When saving a backup you are provided with various options. You can SAVE the program as one of the following types:

Standard speed  
Turbo  
Warp 25

Standard means that the program uses the normal disk language LOAD routines and will be loaded at the normal Commodore disk rate. A turbo saved file will re-load quicker than normal, however, both of these options become redundant once you use Warp 25 either as a load or save? Does the normal LOAD save?

Warp 25 files are of such a format as they can only be loaded either with the cartridge present or from a special loader program. An option exists within the cartridge to save the loader onto your disk.

All files saved at WARP 25 will re-load in 4-7 seconds, or so. Hard to clean in game loading time is a little longer as you do need to LOAD and RUN the loader program if the cartridge isn't present. However, this only adds a couple of seconds onto the loading time - also needs a parallel disk operating system?

If using cassette then you now have an option regarding the speed of the SAVE. TURBO saves your programs in only 4 seconds that they will re-load at between 3 and 4 times faster than normal. SUPERTURBO saves the programs so that they will re-load at 5-10 times normal. Superturbo requires that the disk is in good condition and that you are using good quality tape. If not the results can be unpredictable.

For those advanced to tape programs facilities exist to copy files into the program and LOAD programs from a special disk available from Data!

## Party Pictures

As well as giving excellent backup facilities a number of graphics options also exist. As with the Final cartridge if you can disable sprite collision detection enabling you to cheat at some of those difficult games. It's important to note that not every program will work with sprite collision disabled. Another parallel with the Final Cartridge III is the ability to edit sprites however the

editing facilities of the Action Replay IV are far superior. The sprite editor is a 'real' one with the ability to display sprites in either normal or multi-colour mode, change the colours, alter the sprite over sprites, etc. In fact as a stand alone program the sprite editor would be fairly useful. For a games programmer this, as a memory resident sprite editor is a must and will allow them to stop their program at any time, break the way their sprites look and then carry on with the game. The sprite programmer can have great fun altering the sprites to their favourite games.

Options exist to dump screens to a printer or save it out in such a way that it can be re-loaded by another package such as Screen Paddles (also from Data!). The graphics dump is not as versatile as the one on the Final Cartridge III and doesn't include sprites in the powerupan and Commodore printers are needed for.

One 'break away' feature of the cartridge is the Text Modifier that allows you to search through memory for a specific string and change it to another - great if you want to add your own name to the high score table of a game before you SAVE it.

## Utilities

A number of useful facilities are provided by the cartridge. There's a file formatter for disk users. A file copier will copy individual files including WARP 25 files. You can even change normal programs to Warp 25 and vice versa. The file-sifter comes into it's own when you realise that it will work with two disk drives - so those tedious disk swapping! Should you want to copy a whole disk then a disk copier is provided for copying approx 400k disks.

## More from Basic

As well as providing the expected cartridge orientated facilities the Action Replay IV cartridge, like the Final Cartridge adds a number of new facilities to Basic.

Firstly a DISK is included so that you can access the drive without getting directions etc. Furthermore the function keys are defined so that some commands can be entered with one key-stroke, for example loading and running the first program on disk.

A number of other basic commands are provided not as much as the final cartridge but still useful.

Naming a few of the new

instructions:

OLD - will restore a NEW program  
LINE SAVE - saves a range of lines to disk

MERGE and APPEND allow you to merge/add one program.

AUTO prints out various line numbers.

PLIST sets a listing to the printer.

## Monitoring

An extremely powerful machine code monitor exists within the cartridge.

Unlike all other monitors entering it doesn't perform a state to stop the program currently running. Upon entry all of the computer's registers including the screen stack and zero page are all listed, at 10k of the computer's memory remains unaffected by the program.

Once again all the expected commands are present including disk monitoring and disk editing facilities. You can examine memory contents in hex, ASCII and CBM screen codes. Conversions between binary, decimal and hex that as does the original allow to perform a Base function.

## In the Ring

Both of the cartridges looked at here offer the user, essentially the same facilities. The Final Cartridge is more powerful than the Action Replay cartridge and for me has a number of features that would soon become redundant.

If you are a newcomer to Commodore cartridges then you will probably like the push down button-in drive environment - very friendly. Furthermore Basic programmers will no doubt find the wealth of toolkit commands useful.

If you are an advanced programmer and are more interested in programming your computer in machine code then the inclusion of the Action Replay cartridge a cartridge Disk or even will also find WARP 25 a delight. Don't forget you can even backup your own programs and save them at turbo speed.

So which one would I use was the overall winner? Well both cartridges have their own good and bad points and I could list supplies me for both of them I could've had both if you did you wouldn't be disappointed. Should I have to make a decision to purchase one then the Action Replay IV wins as, requirements as a serious user far better than the Final Cartridge.

# Auto-Start Maker

*Give your disk programs that professional look by  
making them auto-start*

*By E. Godden*

**A**mong every genre of commercial software accessories when loaded from disk. Further more, many have screens that are displayed while the programs loading giving information about the author or program instructions. Unfortunately not many people who would like to give their own programs that professional touch, the process of auto-starting a program, let alone displaying a screen is quite difficult.

The program presented with this article changes all that. It allows you to alter any Basic program file, that BEG or length so that it will auto-start on loading. It also allows you to design your own loading screen using characters accessible from the keyboard, that will be displayed while the program is transferred from disk into the computer's memory.

## Protection Plus

Apart from the convenience of your program auto-running because the program auto-run you will be able to protect your messages from prying eyes. A simple method of protection would be to make the following statement the first in your program: **POKE 999,251**

This quote simply disables the **RUN/STOP** and **RESTORE** keys. Further protection could be added, such as a routine to erase the program on a key stroke.

The **AUTO START MAKER** program loads the Basic program into random memory. It then writes the program to disk with the necessary machine code and the loading screen. The process adds about 6 blocks

(15K) to the program length, about 1K of which is the loading screen. To use the adapted program type **LOAD "PROGRAM".5,1**

The 5,1 above may be left out or the program will not **RUN** if the Basic program loads any machine code blocks. It should contain **POKE 127,0** before the **LOAD** command otherwise the computer thinks it is in direct mode and print the normal loading message.

## Auto-Starting a Program

A detailed line-by-line of the operation of the **AUTO-START MAKER** is given below. Careful reading and following of these instructions should give you some extra time.

To start the **AUTO-START MAKER** simply **LOAD** and **RUN** it. There will be a short delay while it loads the machine code files from disk. The main menu is then presented.

The **MENU** has the following options.

**COMMENCE AUTO-START PROCEDURE** - This option makes changes and returns the Basic program that you wish to auto-start.

**DESIGN LOADING SCREEN** - Selecting this option puts you into the screen editor. To exit the editor press the **F1** key. The screen that you have been working on will not be lost. **LOAD LOADING SCREEN** - Allows you to **LOAD** a previously designed screen into the editor.

**SAVE LOADING SCREEN** - Puts a copy of the current editor screen onto disk.

**READ DIRECTORY** - Displays the

contents of the disk error channel on screen.

**NOTE** - It is not necessary to **SAVE** the loading screen with the above option. This simply allows you to **SAVE** a copy of a screen for later re-call. The **COMMENCE AUTO-START PROCEDURE** uses the editor screen with the "top" Basic program.

To use the program simply design or load a previously saved loading screen. **F2** allows you to design your own screen. Use the normal keyboard characters and adding keys (function) to design your screen. When the cursor comes to the bottom of the screen it will appear at the top.

The colour keys have no effect on the display as the colour of the loading screen is pre-determined by the colour memory on loading.

Once your screen is designed press **F1** to finish.

Next select the **COMMENCE AUTO-START PROCEDURE** option (**F1**). You will then be asked if there is a screen in memory. If there isn't you will be returned to the menu.

The next prompt asks you for the name of the program that you wish to convert to auto-start.

Remember this program must be in Basic and must be less than 9K.

If an error occurs then **DISK ERROR** will be printed on screen and you will be asked to re-enter the program name.

Once a program has been successfully chosen and entered into the computer's memory you will be asked to enter a name for the new version of the program. You can't replace the original but it's safer to

and the program a different name.

Your program will now be responsive to the disk with the same file blocks added and will auto-start on loading, as long as you remember the secondary address.

### Getting it all in

There are two programs published in this magazine: AUTO-START DATA and AUTO-START MAKER. Type in both programs separately and SAVE them to disk, before you RUN them.

The program AUTO-START DATA reads two machine code files from DATA (assumes) into memory and then writes one of the machine code routines onto their own's disk. The program AUTO-START DATA is no longer required.

The program AUTO-START MAKER is the program that you should now LOAD when you want to make an auto-start program. When RUN the will automatically LOAD into the computer's memory the two programs created by AUTO-START DATA.

When entering the AUTO-START



MAKER program pay particular attention to line 170-180. Accuracy of these lines is essential for the program to work correctly.

### Closing Notes

Although it is stated in the above text that you can't auto-start a machine code program with the routine presented here, there are exceptions. If the machine code program has a list of

Basic with a SYS call it should then auto-start.

If you don't want a loading screen when your program is loading, go straight to the COMMENCE AUTO-START PROMPT (IRE option). When asked if a screen is necessary type "N". A completely blank screen will be displayed when loading back your auto-start program.

See listing on page 62

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# Clear With Basic

*Clear your text screen in many different ways with this handy set of routines*

By N. Higgins

The clear screen function of the C64 does just that - it clears the screen in one go. In many cases this is all that you require however, there are times when it would be nice to clear your screen in a different way just to make your programs look that little bit special.

Presented here are some simple Basic routines which will enable Basic programmers to clear their screens in a variety of different ways, instead of the usual PRINT CLR/HOME.

## Using the ROM

Three ROM routines exist within the C64 that enable us to play around with the way that the screen is cleared. Two position the cursor, the other clears an entire screen line. We will use these routines in some of the example-presented later. First it is important that we shed some light on the use of the routines.

To position the cursor you use

```
POKE$1,X:POKE$14,Y:SYSTEM3
```

Or

```
POKE$1,Y:POKE$14,X:POKE$13,SYSTEM3
```

Where Y is the row from 1 to 24 and X is the column from 0 to 39.

To clear an entire screen line you use

```
POKE$14,Y:SYSTEM3
```

Where Y is the same as above.

## The Listings

Our first program LISTING 1 is the base for many of the other routines to come that is a `SAVE` it. When you enter the other examples you need only

insert the new lines given into a copy of LISTING 1.

If you `RUN` LISTING 1 and press a key, the screen is full, you will see the screen clear from top to bottom. You may not think that this is that fancy but it does get us started! Careful examination of the listing should make it clear how the program works.

Now let's reverse LISTING 1 and make the screen clear from the bottom of the screen to the top, easy, just type in the new lines of LISTING 2. Just by adding an extra variable `Y%` and incrementing this by one every pass through the loop we reverse LISTING 1. It's very simple and works a treat.

Now that we've got a couple of simple clear-screen routines let's just throw up a bit. Instead of the new lines of LISTING 3 into LISTING 1 and `RUN` it. We now have a cursor flash starting from the bottom left and going in an up-right fashion in columns of 10 characters.

On to the next routine. Add the lines of LISTING 4 to LISTING 1 and `RUN` it. The screen will now clear at four sections all emanating from the centre, very nice isn't it? Why not try to combine the two routines together so that they clear at the same time?

LISTING 5 gives a partial answer to the above problem, again add the lines to LISTING 1 to see the program work. `RUN` this and you will see the screen clear in four sections all at the same time.

Still not impressed? Okay, now for a couple of more dramatic routines, insert the new lines of LISTING 6 and `RUN` it. After pressing a key, you will see the screen contents disappear in a more unusual way, starting from the top left and ending at the bottom right.

The next example given is more suited to my opinion to present

Maybe it could be used for clearing the screen then the game is over. Insert the lines of LISTING 7 or LISTING 8 and `RUN` it. You will now see the contents of the screen disappear from the four corners of the screen towards its centre. Excellent and all from Basic.

In the routines presented here are two slow or fast list for your requirements, there was an alternative `OR` option if you want to clear your screen really quickly then you will have to resort to machine code.

This brings us onto our last example where we have a machine code routine that will clear the screen from right and left towards the middle. Add the lines from LISTING 9 to LISTING 1 and `RUN` it. When you press a key you will have to wait for a few moments for the machine code to `POKE` into memory. Not very fast from machine code you might say, but by `POKE`ing memory location 49321 with a number from 1 to 255 you can change the delay. 1 is the fastest and 255 the slowest. Even with the delay set to 1 the routine isn't the fastest that could be written. Then again, if the screen was cleared any faster then you wouldn't see it so what would be the point of using a fancy routine?

## Back From The Past

For more examples of clearing the screen with machine code refer to a past article in *Your Commodore* September 1986 called *All Clear*.

Incidentally you could use the ROM routines mentioned in the article to position the cursor anywhere on the screen. Just set up two variables X and Y to the correct column and row, and produce a sub routine to call the ROM routine and position the cursor.

See listing on page 81





# Games Update

**T**he perspective among you will have noticed that we have adopted a new style for reviewing games this month. Not every game reviewed will now get a full review. Instead, four or so of the most interesting games will get reviewed in depth each month and the rest will get lumped together in our large summaries. This style is largely experimental so please write us and let us know what you think.

## Full Price Games

**APOLLO 16** (Electronic Arts) is an appropriate title to launch the new section. Here is your opportunity to participate in a new nation of astronauts from the American Space Program. You must first off deck land on the moon, explore the moon's surface (ascend) from the moon and re-deck, walk in space and finally re-enter the Earth's atmosphere and splash down if you are to accomplish everything successfully.



The game looks as if it is going to be an astronomically complicated flight simulator but in fact it is considerably simpler than that. Most of the actions required of you involve no more than pressing your few buttons at the appropriate moment. Be warned though: timing is absolutely crucial (timed as in the middle of a second) and too great an error will result in the entire mission being aborted.

The program itself is extremely well considered ranging from the variety and quality of the graphics, to the carefully chosen which adds just the right amount of atmosphere. All that is really lacking in graphics is there isn't any enough of it and that there more space textures will soon see at the game.

Another way of increasing your grey cells albeit somewhat over the plotting a space rocket is answering



questions on one of the numerous cards shown on television. Should you not be able to get enough of your daily fix, Domark have come to your aid with a computer version of **BLOCKBUSTERS** on their TV Cards label.

For anyone unfamiliar with the game, the playing area consists of a matrix of hexagons, each containing a letter. The players are then asked a question the answer to which begins with the letter that is in the hexagon. Getting the answer right changes the hexagon to your colour and the object of the game is to form a continuous line of your colour joining opposite sides of the grid.

The game is designed for two players and this tends to cramp things somewhat round the keyboard. The computer decides which player has passed their 'turns' first and invites them to type in their answers. In theory it doesn't matter too much if your spelling is a bit off as the computer will 'guess' what you meant and answer accordingly. This worked well on some occasions and badly on others. Surely it would have been better to ask the player to shout out the answer and use the keypad to point to a right or wrong box accordingly.

On winning the best out of three games, the victor is invited to take part in a **Grid Run** which is more of the same except that phrases instead of single words are used. This unfortunately degenerates into a test of typing speed rather than any other ability. The graphics are adequate complete with a digitised picture of the host Bob Holman shaking his head dejectedly. The game itself though does not adapt particularly well to computer format and I would suggest that you stick to watching it on the box.



**SCAPOLIS** from English Software is a very slickly produced shoot-em-up but you can't help but find that you have seen it all before. After the usual name plot, a computer that as usual, you are the only person in the entire galaxy who is immune to the threat of the Galactic Empire and it is up to you to save the world again.

The game is in two parts starting off with you attempting to blast every thing in sight. A split screen is used to represent the planet in 3-D (remember Sarcoid) and you have to shoot down a given number of battle fleets before you are allowed access to the second part of the game. After successful docking, you are transported below the surface of the city where you must leap from platform to platform avoiding misaimed robots and evil eyes. Comradeship with impossible enemies are a fun albeit inevitable by-product of this one and it is onto the next city you see.

The game actually plays very well but surely there must be some originality left in the industry somewhere.

First of the cat's paw, **2000 AD** will be remembered as the most advanced **SLAINE** produced by Nemex. The land of Lyonesse is under the evil rule of the Devere Lords and it is up to you Slaine, with a little help from your more low writing role Tech Link to rid the land of this terror.

Slaine is a more direct adventure although it is unusual amongst others in that you get to do so much as there is also a combat system. Slaine actions are also presented to some extent by his wimp stang. This is a measure of his strength and power which decreases as he gets wounded or hungry. Movement wimp power is needed before Slaine can go towards

control.

This game is totally suited to one screen, both in the game design. The Rules system of selecting your commands. The initial screen of screens (aiming to mean thoughtful scroll and fast across the screen too). You have to shoot a screen-based hand and point to the command that you want. Timing is important and if you misjudge things, you are quite likely to shoot something entirely different from what you intended. This is no more than a joystick but it renders the game unplayable to all but the most adept 300 AD fan. Certainly, traditional adventures will hate it.

If you have not dreamed of being a



tester, it may be the able to attend a Formula 1 TEST DRIVE from Decima Arts may prove to be the best bet thing. You are given the chance to test drive one of five of the world's top sports cars. Apart from the Porsche 911 there is also a Lamborghini Countach, a Lotus Turbo Expert, Ferrari Testarossa and a Corvette.

Obviously there are not ten designed to stick to American speed limit of 55 mph. With top speeds in some cases of over 250, it is only normal that you would want to put in the car through six gears. The only trouble is that the fuel gauge can be a little tricky if you try to burn them off. Some you can pull away from but others will leave you limp and accept a ticket like a man.

The Drive plays reasonably well but it is lacking a certain something that keeps it from being one of the top notch racing simulation games.



128 different levels coupled with 8 different house systems search like the renowned support documents from HUNTER'S MOON from The Immortal. There is a fourth shoot-em-up but unfortunately their weakest to date.

After much anxiety entering a black hole you find yourself in a strange region containing base like structures that regenerate almost as quickly as you can blast them. Your task is to locate all the Starbolls on your radar and collect them. As you progress through the various systems so you can gain co-ordinates allowing you to skip levels.

Although the game is very well put together, I found it lacking that one vital ingredient of all classic shoot-em-ups, addictive music.

Another shoot-em-up on offer is MACH from Starbreeze, a Danish company. Again, the plot is somewhat familiar. As Knight of the Galaxy, you are trying to rescue three planets from



alien.

The only thing about this game that I do not accept is why when there is total space freedom in the offer of an Amiga should you find the worst personal difference, you've seen it all before.

### Budget Games

CODE HUNTER from Pentard was you battling against a host of evil of unknown origin. Your only hope is to discover the necessary codes to deactivate it. To do this, you must enter each of the computer networks and destroy the guards there before you can escape with the relevant bit of code.

Each screen of the computer screens of a screen made up of squares. You move around this knowing bombs can be which you must lure the guards. The problem is that the squares consist of one way transparent, teleport systems, and energy modifiers. This means that your path must be chosen carefully.

The one nice bit is Amiga's strategy game let down slightly by poor graphics and the fact that once you have worked out how to complete a

particular screen, you may never get killed there again.

LEGION OF THE AMAZING WOMEN from Madhouse is a two-months-waiting shoot-em-up. The Amazons were a legendary tribe of female warriors although you would never guess it from this as they look more like they are trying to tickle each other with flabby chests rather than beat each other senseless out. All this plus trying to dodge numerous arrows. Give it a pass.

ARAC from Adhivision is a rough better game. Originally released as full price, it never received the recognition due to it. An arcade adventure with some good graphics. You are Arac, a great thief with a few friends and power.



thing.

As well as retrieving your missing light and power orb, you must also cut your way out to capture the Amazon enemies that inhabit the laboratory. There will still help you to return for their freedom. Each of the five scenarios has different power-ups but they can grow through to let walk whereas the last will help you return, the enemy earlier. Definitely a game worth looking out for.



PUB GAMES from Allegory is another pleasantly dull price change that may appeal. Seven different games that you play from the comfort of your own Amiga but personally with a lot or two of bits for accompanying.

There are a number of games in the game such as playing volleyball after part was through the levels but on the whole. Pub games is a good laugh and a worthwhile addition to all those diceless type games.



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# Tabulate

*Give your numerical  
printouts that professional  
touch with this  
Basic subroutine*

*By D.J. Trigg*

Computers are excellent for performing repetitive sequences of complex mathematical calculations, and clearing out large masses of highly accurate answers. One thing that most versions of the Basic language are very bad at is giving you the result in a neat and readable form.

In this respect, Commodore Basic is typical. There is no way to control the format of the numbers, with the computer padding its own stuff up when it changes from the decimal (123.456) to the "scientific" (1.23E+4) modes. You cannot decide how many digits will appear after the decimal point or if there are to be leading zeros so that all numbers end in a standard length. As a consequence the length of number strings may vary from three (negative digit) and the following spaces to several characters (negative digit plus decimal point). If signs two digits and following space.

The commands available for controlling the print-out are the printer, the TAB, SPC, and "comma" functions, all of which arranged to work to the start of the number string or within your answer, all have the same number of digits ahead of the decimal point; it wanders around the columns as well. This is especially annoying when you are printing out columns of values.

The "comma" tabulation facility is usually of little or no use, especially when there is no way to control the column width it provides. The C64 gives you a fix, which means that although about strings do line up reasonably tidily, the longer ones spill outside their own columns and leave the next number to be displayed into the next one which is then also outside on to the next line. You are almost certain to end up with your

number spilling on (and/or under) the page, with the headings often straggling over the spaces between the numbers or over the wrong column altogether!

In many cases use of the "Rounding function" or

`ROUND(X)=INT(1000*X)/1000`

to give a "three decimal places" form together with the TAB function will give a reasonable neat layout to begin with. However, the function does not stop the numbers wandering from column to column and the TAB SPC and "comma" still line up on the first character.

In addition, there are two other matters lurking in the background which also need to be pointed out.

• Your printer almost certainly does not recognize the TAB function and the printed will wander all over the place. All the effort you have put in to get the screen layout neatly organized is therefore wasted.

• There are certain "magic" numbers which do not print out as you would expect them to, and instead of getting the expected number of decimal places printed, you get the full length string. If you are using 1000 numbers, with narrow columns, these numbers will spill out and upset the rest of the list.

If you have not met these "magic numbers" before try entering `PRINT 5.5E7` in immediate mode or as a line in a program, and see what happens. There are quite a lot of these numbers, and if the result of any calculation involving the "Rounding Function" has three digits after the decimal point (1000\*5.5E7) to three places of decimal in its number "magic" number. Again, the problem is not a Commodore Basic problem.

TABULATE was written to overcome most of these problems and to provide a few other aids to neat result tables, while it was about it, trying you live to think about the real job your program is supposed to be doing.

It doesn't do all the work for you, so that it cannot decide on the best layout for your numbers - you still have

to think that out for yourself!

What if doesn't decide if you choose each thing as the numerical selection: the width of each column, the position of the numbers within the column, and the number of decimal places displayed in a simple way and to let you alter them without having to rewrite half your program to keep the whole thing printable.

It also lets you put the headings neatly centered over each column and keeps them there if you change the column width.

TABULATE works with the output sent to screen or printer looking the same, as it does not use the TAB function. Because of its simple control over the column widths and the type size of the numerical strings, you can experiment with the screen with these set to give anything contained within the screen boundaries, and when satisfied change the parameters so that it fits the printed page to better effect.

It would almost be to perfect. One thing it does not overcome is the fact that you cannot set spacing to a full character value. Depending on whether the numbers and headings have odd or even the screen counts, and the column widths are odd or even, so some headings may look better offset to one side or the other of the "usual" center of the column. If the happens, try increasing or decreasing the offending column width by one.

## General Description of the Program

TABULATE makes use of the "Rounding function" combining this with extensive use of the string handling facilities to perform its various tasks.

The program is controlled in one way (by means of a "format control string", FMS) see below for a description of that, or 2) by directly specifying one or more of its program constants.

Once the format has been established for each column, the headings are printed by assigning a text to PE\$ and the numbers by assigning their values to PA.



**R** = The normal or "decimal" notation (Rounded up to P/L places of decimals. (Note the rounding up is done on the ABSOLUTE value of the number thus -4.15 will be rounded to 1.2 to one place of decimals rather than 1.1). Numbers with less than P/L decimal places, after the decimal point will be padded with trailing zeros.)  
**M** = (M)ones format. An "R" rounded except that the numbers are broken up by the conventional commas of the thousand, million and one thousand million points.  
**S** = (S)cientific notation, again with the values rounded up as described for "R" notation.

**F** = (F)loating notation. This is similar to the scientific notation except that the position of the change or steps of three. Probably most used by electronic engineers.

**U** = (U)nter, other letter except R,S,M or E). (U)nterchanged points numbers not in the computer words there. Most useful if you have chosen the "R" format and all your programs are 000. Change the format to "U" and it will let you see it in your programs that are in fact as if you have chosen an inappropriate format for the results.

The output may be justified:

**L** = to the left of each column.  
**R** = to the right of each column.  
**C** = for any other letter except L or R) - (C)entered with the decimal point aligned down the column.

\*Read FMS routine (1000) reads FMS lines by name from the list. If the first name is a NUMBER this will be read as @COLUMN with The first LETTER is taken as ITYPE, and so on.

Therefore if you want to change the number of decimal (P/L) places displayed, you MUST provide it with the ITYPE you are using as subscript. \*Read FMS routine the number as @COLUMN with Standard if you want to change the (M)ultiplication you must provide it with the correct ITYPE letter, or your "U" inter will be taken as the ITYPE with the R if you have included it as well as PL.

\*When these rules, any item may be omitted, in which case the variable it represents will retain its current value. Once you have set up all the items or values (ie. CODE=40000) you

only need to put in the thing you wish to change.

Examples of valid forms of FMS are FMS= gives all default values FMS=@44C@' modifies all the parameters FMS=@C@' (C)olumns with and (P/L)aces unchanged. "R" rounded notation selected with an other spacing numbers with a (S)ize of 4 characters instead of the decimal point.

## Formatting with Tabulate - Demo

The power of FMS formatting comes into its own when you want to make up complex tables with many changes of format. In this case you can load all the FMS values into a zero array from two or three line DATA statements and call them up rather than a "FOR NEXT" loop which also tells your results in order or by the array number or the sequence you require them.

In some cases it will be found quicker to change a single formatting parameter directly. For example if you only want to change the column width from sixteen value to say 20 you would just put "CO=20" before the next number.

I have included a shortish program, called by the required name of "FMS@" which should make use of both methods of control clearly. This little program shows in particular how FMS and the four routines of TABULATE can be used to best advantage.

The program itself does not do anything very clever, and most of it consists of table formatting. I did say at the start that you shouldn't have a lot of work to do! But you will see how all the controls for the program can be contained in DATA statements, and how the "read FMS" routine may be used to extract information from the data to control for example the lengths of the dividing lines separating the parts of the header.

DEMO puts the DATA lines out for you after each line so you can easily make changes and re-run the program to see the effect. As written, some of the changes made initially are not too clear. We will quickly see

one result this, and then think back to how you would have done it but on the advent of TABULATE.

## Getting it in

TABULATE is written without using any of those hated "Commander Graphics" symbols so coming in should present few problems. However there are some things you will have to do to suit the hardware carefully. You may "format" the program if you want to by leaving out all the REM and spacing (159998) 5 lines. The program is numbered to let you do this without the danger of GOING to a non-existent line.

Type in the program, and select the disk or tape.

TABULATE is intended to be loaded on to the end of your own program and is numbered accordingly. If you wish an extended line or word, a bridge that goes over the MERGE or APPEND ability then life is easy for you, and you can add it to existing programs using their means. If not you will have to type TABULATE on to the end of an existing program each time.

For new programs load TABULATE first and then compile your program on top of it.

If the line numbers clash with existing lines in your own program then of course TABULATE accordingly that makes you responsible of the GOING and GOING programs - you do.

You must also check that the variables used by TABULATE don't clash with any in your own program. Tabulate uses:

```
CO DD DV DL FMS JU P/L
PL PE PNR SI SPS T1 T2
```

If you are in the habit of compiling your basic programs, especially with PRTSPEED you may find that two named variables, names such as three state change things to be kept. If this occurs you will have to re-name them as C1 D1 etc. I make no attempt to do this if it is the first place - move the names were shared earlier because they formed an easily identifiable statement. CO TV can be used to change and add/lets to be used by anyone else (DD PE etc).

See thing on page 11

# Tabulate



# Mini-Putt



**F**irst Leaderboard will feature a mini-putt game that is both a new and familiar playing experience for the world's mass of C64 gamers. Originally from Microsoft as one of the classic courses to come, it's a great game for all mental sports.

The game was written by Electronic Arts by a college who is in the lead behind games like Baseball, Kicked Out! (Sud and Curses and other classic EA games - Tom Derry and Apollo II. All these games have one thing in common as they combine addictive gameplay with great graphics.

The Mini-Putt screen is divided into four sections. Two thirds of the screen shows a top-down view of the hole being played and a red ball and a cross that is used to aim the ball. The other third of the screen shows a 3D view of the hole and a 3D view of the ball. The ball is a small red sphere and the hole is a small red sphere. The ball is a small red sphere and the hole is a small red sphere.

To take a shot you must first aim the cross in the direction you want the ball to travel in. You can move the cross in the direction that you want by moving the cursor on the left of the screen which also changes the distance by the color. Pressing the fire button starts a bar moving up a page so that the release of the button determines the strength of the shot and also starts a bar moving over the distance gauge. The bar is a single line that you must stop the bar on by pressing the button once you reach the bar and the ball will stop. The bar is a single line that you must stop the bar on by pressing the button once you reach the bar and the ball will stop. The bar is a single line that you must stop the bar on by pressing the button once you reach the bar and the ball will stop.

It is the holes which should walk straight on a flat

green. Unfortunately this is what golf and they take a look at as the courses are far from flat and contain a variety of obstacles put in your way from variable slopes to walk bridges - an airplane, elephant, castle and even the La Mota!

The four courses are given the misleading names of Deluxe Classic, Traditional and Challenge which you'll never see in standard courses, traditional and impressive. Each course consists of nine holes and can be played by up to four players who take their shots alternately with the result of the preceding hole dictating the playing order. The holes vary from par six to three which also means that the player going first is used by the others as a paring peg.

The Deluxe course is the easiest with the holes consisting of walled paths and a network of slopes that are marked by colored areas with arrows showing the direction of the slope. This may look simple but it's not easy to pick a shot through a narrow channel with slopes. At the end of each hole the scores are displayed for each hole as well as the remaining holes and the par for the course so far.

The classic course is undoubtedly the best as it contains some of the hardest holes in Mini-Putt. One hole is particularly difficult thanks to an elephant that's standing right in the middle of the course. To complete the hole so that the par three you have to jump your first shot so a red elephant's trunk that will hit you into an impossible position over a narrow bridge that opens a new passage through a series of slopes that will then lead over the hole. This hole is a very difficult one to beat but through a gap in a wall past the wading elephant and into the hole!

The reward for completing the hole is a chance to fail on a traditional walled before trying to get your ball past a revolving airplane propeller and then into a cannon that fires you over the walls that really surround the hole. This course also features walls with small holes in them such as the ones in the castle wall that you must hit the ball in order to find that it shows up in the wrong direction but in the wrong possible place. There's one hole where the exit runs depending on how many players have passed through and another who tries to copy the success of a player before they will find themselves going backwards.

The traditional and challenge courses are back to the simple walls - water and slopes of the first course but these are arranged in such a way that you have to be exact with your shot's strength and direction and take your life in your hands just to break once. Then a Mini-Putt at it's toughest as the slightest mistake could end there short. The on screen golfer will mimic your actions and will jump into you if you walk a par or even a hole in one which is accompanied with a fanfare to impress the neighbors but he will stand valiantly over the hole if you go over par and break his club over his knee in disgust if the shot ends up in water.

Finally two games of advice. The first is printed on the packaging and advised you to remove any forestable objects as they don't get hit by the ball and secondly if your opponent is put in a par (two - three) length too badly as a could happen to you on the very next hole.

A superb new twist to the Leader Board style of hit and hope golf game.

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# MAHJONG COLLOSSUS

**M**ah Jong is an ancient Chinese game full of flowers, cats, no sounds and dragons and packed with the mystery of the Orient. It is also the latest in the Colossus series of strategy games from CDS. If you've ever seen the Chinese playing Mah Jong at incredible speeds you may have noticed a blur of bamboo and ivory tiles coated in mysterious symbols. These symbols have now been transferred into C64 pixels that accurately depict the form and shape of Mah Jong.

Mah Jong is played with a set of 144 tiles that are shuffled for a hand or scattered and laid into a wall and then dealt to the four players who are known as East, West, North and South. The object of the game is to build up a complete hand of 14 tiles that consist of pairs (2 identical tiles), Kongs (3 identical tiles) and chows (a run of three tiles of the same suit) and a pair. You begin the game with 13 tiles and take it in turn to take a pair from the wall and then discard one. You can pump a tile by choosing a discarded pair for a pung or a kong but you can only claim a chow from a pair being played by you.

This single game version has prompted others, so compare Mah Jong to its four game running but a few hands of Mah Jong will convince you that this offers a lot more fun of the three Mah Jong sets (the bamboo, caries and characters) contain four tiles that range from one to nine so there can be a scramble of more than one player is going for the same pung. The two to seven of each suit are considered minor tiles and a pung of them is only worth two points whereas a pung in the major suits or ones is worth four points. The Mah Jong set also contains winds and dragons that are not only north four points per pung but a pung of dragons or your own wind will double your score. There are also four flowers and seasons that correspond to the four players and will score a double if you get your seasonal three, double if you get all four seasons or flowers.

Two points for a pung and even with 26 points for going Mah Jong you can score a lot, but thoughtful play and the collection of pairs that give you doubles can even build a suit of worth hundreds or even thousands in a single hand! To add to the drama the player who is current has pairs and chows double but where the tiles are compared at the end of a hand.

To assess a really big score you should go for one of the special hands that can earn you 1000 points or more hand. These hands have amazing names to make their value and the difficulty to create them but should you collect buried treasure four blessings hovering over the door, imperial robe or a pair of horses you should expect it as a treat for a long time before you see another one.

Colossus Mah Jong provides you with three computer opponents that use play at two different skill levels and the inclusion of features such as Holdplay at the end of a deal so the owner of the system that really enjoys the elevated play and the ability to turn on and off game components such as special hands and hidden displays to make the game as difficult or easy as you want.

A full game of Mah Jong consists of ten rounds which consist of many games so necessary for each player to have a turn at play. This can often be more than four or five rounds East of the game Mah Jong. On the computer is the real game that can take several hours but you can shorten this by only playing one or two complete rounds.

I have played Mah Jong five or six times and have often wondered if it would be would be computerised and whether such a version would accurately depict the game and include the special hands. Now CDS has done all that and



added a detailed program to teach the game and good hands or beginners can learn the game with player computer opponents for the cost of a computer screen or disk before spending £20-30 for a full set.

The graphics, although accurate can be quite slow but this is acceptable as Mah Jong isn't a game to be rushed. I found the screen display to be clear and accurate although a little difficult to distinguish between the five and no characters if you don't know Chinese patterns. So and it helps to a minimum of blocks whenever a player gets a flower or season or a pung or kong is claimed. Colossus Mah Jong is a highly playable and accurate version of the superb strategy game add to that some computer opponents that will challenge all but the best players and you have a truly colossus program.

T-11

#### Available:

Title: Colossus Mah Jong. Supplier: CDS Software. CDS House, Devizes Road, Devizes, Wiltshire, Tel 01292 21114. Machine: C64. Price: £9.99 plus £14.99 del.

# Bothersome Basic

*How can thought or memory be as can also be fun*

*By Norman Doyle*

**B**ut if, in our initial discussion on variables and figure programs we will first, to check arrays and data available in the most advanced version of Basic programming.

It is almost obvious that a variable implies a storage box for numbers or for groups of letters and/or numbers, known as strings. These work well in most cases but what happens when you have a list of names that needs sorting out into alphabetical order?

Normally you'd make a list of the names, and then create a second list pulling out the names into alphabetical order. The computer can behave in a similar fashion but first it needs a list to work from.

When it's made, when the computer is prompted by the word DATA  
 10 DATA PETE, JEFF, JOHN,  
 FRED, FRANK, ALAN, A1, A2

The computer now knows the names but needs to order them in a sorted or numbered list so that it can pull them around free from one to the other.

An array is a series of variables, having the same but with a qualifying number in brackets, for example  
 A(1)A(2) A(3)A(4) NAMEA(1)  
 NAMEA(2)

A small array, one string value from (1) to (9) can be created simply by using them in a program. A line starting something like NAMEA(1) automatically creates the NAMEA with its elements numbered from zero to nine, inclusive.

Large arrays have to be DIMENSIONED in other words, the outside has to be indicated of the maximum number of elements which will be used. For example DIM NAMEA(1) creates a string of arrays with 11 elements; remember there is also NAME. The largest, one dimensional array has 326 elements and would be set up by something like this

## DIM NAMEA(326)

Always use ahead for one with DATA statements. One line of Basic can set up several variables instead of interminable runs-alike statements, that is NAMEA(1) PETE(1) NAMEA(2) JEFF(1) etc. In our sorting program we can set up the variables by READING the data as follows.

```
20 FORA=1TO7:READ NAA:  
A(A)NAMEA
```

This replaces the long winded alternative which would take up an awful lot of memory with a dimensioned array of 256 elements not to mention the burden of typing it all out.

The purpose of the screen is to show how the sort routine with the array system so we need to print out the names in their original order in the array, it's set up.

```
30 FORA=1TO7:READ NAMEA:  
PRINT NAMEA(1) NEXT PRINT
```

Run the program and you'll see a row of printed names, which correspond exactly with the order given to line 10.

Fortunately strings can be compared to each other using the greater than and less than symbols. Even names which are similar in spelling, such as FRED and FRANK can be sorted in this way. FRANK will be treated as having a value which is less than that of FRED. Even a pair of names like GEORGE and GEORGINA can be separated into alphabetical order using one of these symbols.

In our program we want to compare two names, and then swap their places in the array if the second name should precede the first one in alphabetical order. Using the first two data items, PETE obviously follows JEFF in an alphabetical list so a

statement such as

```
IF NAMEA(1) > NAMEA(2) THEN
```

would be true and whatever followed the then statement would be executed.

The statement would close by exchanging the contents of NAMEA(1) with the contents of NAMEA(2). If we put said NAMEA(1) > NAMEA(2) we would change PETE to JEFF but both array variables would then be JEFF and PETE would be left. We need to move PETE out of its variable into temporary storage like NAMEA(256) NAMEA(1) and then bring PETE back out in NAMEA(2). You may have noticed that NAMEA has not been involved so far in an initial computer's home for PETE.

```
IF NAMEA(1) > NAMEA(2) THEN NAMEA(256)  
NAMEA(1) = NAMEA(2): NAMEA(256)  
NAMEA(1)
```

This would be quite sufficient but PETE now needs to be compared to all other names, but not to itself, for a place. The use of variables gives us a nice way for a loop.

```
40 FOR B=2TO7  
50 IF NAMEA(1) > NAMEA(B) THEN  
NAMEA(B)NAMEA(1) NAMEA(1)NAMEA(B)  
NAMEA(1) = NAMEA(B)  
60 FORC=1TO7:PRINTNAMEA(C)  
NEXT C:PRINT
```

Running the program will compare PETE to all of the names in the list.

Now we have to compare all the names in introducing a new loop using variable B.

```
40 FORA=1TO6:FORB=1TO7  
NEXT A
```

Now the program is complete a careful study of the way it prints out of each series of exchanges will show how the sort program works. Remember that the name will only move if the word that follows it has a higher value



# Commodore Modem Revealed

*Why suffer the deficiencies of commercial software for your modem when you can write your own?*

*By S. Henderson*

The Commodore modem is used by many people for accessing the CompuLink database. *Proter* and *Editor* boards. When using the modem most people use software provided by one of the services mentioned, never dreaming that they could write their own software which would make the modem far easier to use.

This article will describe how you can make the modem work other than under CompuLink, *Proter* or *Editor* software. The modem can only handle 1200 baud reception but can transmit at 75 baud or 1200 baud. This means that it uses around 130 characters per second, and transmits at under 170 characters per second or so.

Due to the nature of the hardware, when 1200 baud is being used the maximum no. of characters can differ. The author of *Proter* who has used intelligent CompuLink access numbers, will have used the service showing the duration of the data in handling. Mail displays only list of messages go one way whereas full displays list data goes both directions at the same time if required. Full-duplex is used for normal CompuLink and *Proter* access at 1200/75.

The Commodore modem is indeed a wonder. It has various types of ports (error-checking) built in and can quite easily be programmed by the user with the necessary know-how and technical information, much of which will be covered in this article.



## Accessing the Registers

Many of the modem's internal registers (see page 104) are accessed by *POB*, *POBing* (prefix), location 36670 with the number of the register that you wish to access, and either *POB*, *POBing* or *PEB* (suffix) location 36670 with all the information to be sent to or retrieved from the modem's register.

It is worth pointing out that in machine code programs must be disabled when the modem is being used. Also when reading memory location 36670, due to a timing problem, the *LDA/LDX/LDY* instructions must be given time.

No basic no. problems are experienced as the commands will be performed much slower.

Details of the modem's registers

are shown in figure 1. All of them are used to control the modem when accessing information from the telephone.

Jump Tables are used to access useful registers that control the editor mail frames from CompuLink among other things. Information is given on some of the more useful of these.

All of these registers are called from Basic with a SYS command. You should use *DBR* when using machine code.

ADDRESS	
13604	RE-CONNECT after the OFF command has been used
13627	Address the EDITOR
13630	Perform the CONNECT command
13672	Create a new EDITOR frame
13666	Put screen screen display into the editor just above (or BEFORE the one)
13669	Send current EDITOR frame to a Commodore printer
13675	Perform the EDITOR "LAST" command
13678	Perform the EDITOR "NEXT" command
13681	Perform the EDITOR "GET" command
13684	Perform the EDITOR "DOS" command
13686	Was hit a key after prompt
13689	Was for a key
13692	Reset the modem and to set-up variables

### Auto-dialling

The auto-dialling features of the modems are fairly powerful. The program at the rear of the magazine will automatically dial a number, or give names from the DATA statements and then change to user to user chat.

The F1 and F3 keys are used to swap between who is sending and who is receiving, and the F7 key will drop the line. Note that if only one end presses F7 the line will still be connected for the other person, unless it has F7.

The RUN/STOP key is NOT disabled, so do not press it when using the program or the modem will remain on line. To stop that, use the modem RESET command (POKE16610:1:POKE16610:1:1).

This article should have alerted your appetite just enough for you to start writing your own software for your Commodore modem.

See listing on page 78

### Figure 1 - The Registers

#### Register 0 - STATUS - READ ONLY

Bit 7 - LENDRDY - Ready to transmit

Bit 6 - LRDRDY - RX data available

Bit 5 - LDCD - 1 no carrier detect

Bit 4 - LERRR - Framing error

Bit 3 - LERRN - Parity error

Bit 2 - LIDCD - 0 no carrier detect

#### Register 1 - MODE - READ/WRITE

Bit 7 - LPOVC - Parity bit - odd

low = 000

Bit 6 - LPEN - Parity bit - all

low = 00

Bit 5 - JSD00 - TX baud bit - 1200

low = 0

#### Register 3 - COMMAND - READ/WRITE

Bit 7 - LEREN - Receive enable

Bit 6 - LTRN - Transmit enable

Bit 5 - RESET - Set to reset

cleared when complete

Bit 4 - LD00M - Demodulator

output buffer enable

#### Register 4 - LINE RX/TX -

READ/WRITE

READ DATA BYTE RECEIVED

WRITE - DATA BYTE TO

TRANSMIT

#### Register 6 - CONTROL PORT -

READ/WRITE

Bit 2 - FNFILT - TX hand filter

Bit 1 = 0

Bit 0 - SRRZ - Slave rate

#### Register 8 - DIAL & TIMER -

READ/WRITE

Bit 7 - UK/EUR - UK/European

dialling EUR at

low UK or high

60 sec timer set or

start, cleared when

complete

Bit 5 - DIALC0 - Set to start dial

cleared when digit

is dialed

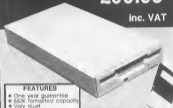
Bit 4 - LSSDC - 1.5 sec timer late

bit 8 but clearing

Bit 10 - DCCIT - WRITE ONLY

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**T**he first game in the series is the first to feature the jungle and I add the adventure to the action on levels and it's also from the award-winning team at EA. Not another game of the like I have seen. Not another game which bears little or no resemblance to the likes of great series. Unlike the best game of the day with its looks, *Dragon's Blood* things just seem to change.

Platoon is set in the jungles of Vietnam and starts you as a new young recruit in a Platoon of five that's deep in reconnaissance. You are totally unprepared for action and are destined to become another casualty's victim. In your early games this will happen quickly as the jungle or the village that last you may be too narrow to handle the tunnel network and number of part two and then the tunnel angle and finally a dash for a hole and cover just means before a sniper is used.

The three war scenes loaded in separately from tape and



# PLATOON

will also survive you as they fly off. The game begins as a small unit patrol of five enter a Vietnamese jungle.

The jungle forms a sideways world where your first patrol must first find a pack of explosives that have been left by a previous patrol. Although there are five in the patrol you can only use one man at a time but can swap freely between them by selecting them from a menu accessed by pressing a button on the joystick. Each man begins the game with a full complement of machine gun bullets and a supply of grenades. As they are shot at and blown up they will take hits and if they get four hits then they're regarded as being killed in action.

Deep in the jungle you'll find some explosives that you will need later and you may even find some medical supplies to heal hits and amputations and privates on the corpse you can use. When you find a bridge you must be quick to get across or set explosives and destroy it before a large enemy patrol crosses and wipes you out. Then it's on into the jungle again as you search for a village. Now you must be as fast and not too close to innocent villagers which will damage your morale and end your game. In the village you may search the bus for a much-needed trapdoor that leads and keeps you for part two.

In part two you are on your own as you explore a narrow network that is trapped out on its right hand side of the screen. The other half of the screen shows your view and you should stay alert for enemy soldiers and part starts those that swim under the surface of the water that will kill the troops and help you to know you. If you're quick enough you can shoot them by using a sniper and trap.

Apart from death lurking around every corner you will

also find an enemy that is really possible to shoot it and it'll be one of you and it'll be the same thing performed by the other trapped ones. When you get into groups you can control you'll find yourself in a hole but your phone can't and instead are destroyed by an enemy attack. You do have a machine gun but will only get some flares to help up the enemy or you'll be reduced to little shots in the dark.

An interesting event and part three leads you to Sergeant Elias who led your patrol, gained down in a hole of enemy fire and discover that Sergeant Berens is indirectly responsible for his death by not helping him. What a letter your mission quickly happens but before you can do a search on the radio waves of a signal in just two minutes. The compass that you collected in the tunnel will guide you north and to water but you'll have to avoid enemy traps and even hidden mines. It's an unusual part come face to face with Sergeant Berens. He is in a hole and armed with a machine gun and grenades and for a thing to kill you - you must avoid his fire and wait for a good ground hit to kill him and close the hole before the second strike.

Each stage of this combat game will demand your skill and patience as at their best otherwise you'll end up a statistic instead of a high score. **TH**

#### You like

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# Teacher's Pet

*For the musically minded take a look at the new package specifically created for music students*

*By Margaret Webb*



**T**here have been very few new educational programmes about recently and now we are supposed to receive a parcel of four discs from Perfect Fourth Software. These were the component parts of a package designed to help students of music to pass the aural part of their examinations. Hence the title of 'Aural'.

Each package consisted of a cassette or disk, an instruction book, a booklet about the Associated Board of the Royal Schools of Music Examinations and a music practice-proctor diary. There are four packages: the first one dealing with Grades 1 and 2; Grade 3 consists of six cassettes which are:

**Scale Progress** - this is an introductory lesson to remind the user how the major chord sounds. The chord is played and the name and its name and the number of the note in addition to the key note are shown simultaneously.

**Sing a note** - in this section the user practices singing single notes on tone

**Name a note** - this helps the user practice recognising a played note. A key chord is played first and then the key note followed by the test note. The user has to say which note the test note was.

**Clap a Rhythm** - self-explanatory.

**Grade 7** uses the same approach but is a little more advanced. In section 2 three notes have to be sung in sequence. Notes also have to name a note but this time with a quicker response. Whether you choose to do section 4 or 5 depends on your singing voice, section 4 is low pitch while section 5 is high. In this test you are given a key note and asked to sing the second third fourth or fifth notes of the scale. Section 6 is again clapping a rhythm but as expected a little more advanced than Grade 1.

Grade 8 has the same approach as the first package. The program continues with singing scales as approach to an equivalent to Grade 2. The additional area covered includes interval singing in which two notes are played and the user is asked to sing either the upper or lower of the notes. In another singing a key chord is played followed by a four note melodic line. The user has to sing the melody aloud getting the rhythm and notes correct.

The Grade 4 package follows very much the same pattern as Grade 1. High or low interval singing is similar to Grade 1 except that you are now asked to name the interval. With melody singing the length of the melody is extended to five notes.

Grade 5 starts with scale recognition. The computer plays, as a key chord and key note and asks the user the name of the key (C, F or G) and then plays another note. The user has to identify the scale. The other sections are very much as for the other levels. All grades have a further option for practicing hearing tests.

Overall, these packages did not measure up to expectations. The programming didn't really use the full capabilities of the computer. Knowing what games writers can get out of the 64, for example, I thought the sound would have been generous. The manual suggests combinations of the computer to a Hi-Fi system—I must have been the one at school, additionally, was limited to the normal character set with (almost) no colour. Although the content is aimed at oral and visual skills, more attention to use of graphics and presentation would have added to the appeal. Due to the nature of the subject, much more to be left to the benefit of the user. The package does look, however, to encourage the user to prepare what is possible, one of the most difficult parts of the curriculum. The full presentation would indeed have the appropriate effect.

I asked a friend who has minimal qualifications for work in the programme. His comments after trying them all were not favourable. He said that other the standards required for the



grades had been considerably lowered over the years or the programme was not testing the student to an adequate level. His other comment was that any music teacher worth his salt would be

willing to let his talented learners free for exploring about the usual text and that it has not another teacher should be sought to be less than these packages are designed to provide personal rather than direct tuition.

Apex from the unexciting presentation, the price of the packages may be argued there, although it is refreshing to see a company which does not charge an exorbitant sum for the disk version.

As I have said in the past, in order to succeed now, software must be well programmed and presented. I suspect that these packages would have been better if a professional programmer had been used with appropriate guidance for the musical adviser.

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# Making GEOS British

Just about every Commodore owner will have heard of GEOS, the Macintosh-like window environment for the C64. More important, meaning this one, have expanded upon the ease of control of the program and its ability to make using the C64 much easier. How ever using GEOS and its associated programs does present some problems to the user. The problems aren't quite simple because GEOS is an American program, written by Americans for Americans, with no thought being given to our poor folk, who would like to use the program ourselves.

The programs presented here will allow you to Anglicize some of the GEOS sets of programs. First, GEDoris and GEDale are given a postscript, an aim that they already lack, by altering the BSW font command. GEDale is given postscript vectors and ground labels in a form the Great British Postman will understand instead of zip codes, states and American address labels. It is important to note that these programs are not yet available on C64s A1, 2 and '11. It can not be guaranteed that they will work with any other version.

## Getting Going

Before you rush into typing in the programs and altering your disks a

word of warning. The programs presented here will alter the contents of your GEOS disks, to make sure that you have a couple of backup copies of your GEOS programs before attempting to alter them. My all a simple typing error could be costly and on your GEOS disk, amenable. Two programs are given here for the enjoyment one for changing the BSW font so that it has a pound sign, the second for altering GEDale's. The programs should be typed in separately and saved to disk before running.

## The Works

A simple description of how to use the programs and how they work is given below. An in depth know ledge of how the Commodore disk operating system is needed to understand the program operation fully. I have therefore kept the program explanation extremely simple. Should you be interested in finding out more about your drive then try reading 'The Anatomy of the 1541 disk drive'.

## BSW LB

In order to give the user access to a pound sign, the program BSW LB simply alters the very last character in

*Have you ever wished that  
GEOS had a pound sign?*

*Have you ever wished that  
GEDale was set up for  
British addresses?*

*We'll read on*

*By Brian Sedgbeer*

the GEOS alternative to the regular edit. In order to save your character set simply LOAD the program guide here, put your GEOS disk in the drive and RUN the program. The program will do the test and tell you of any errors along the way. When the program exits, it will load GEOS if you require. If you do not, a message or an error occurs that follows the restoring your original GEOS disk' screen in your GEOS installation manual.

### New Signs

To access the pound sign when in GEOS simply hold down the Commodore key and press the \* key.

There are a number of other characters available to GEOS that aren't mentioned in the manual. These are accessed by holding down the Commodore key together with another key:

- \* will give an underline
- # will give a closing up-arrow sign a vertical bar
- / will give a slash in the opposite direction
- Over ] and [ a tilde (~)

### Program Description

- 05 Install Demo  
20 Open GEOS format file  
21-29 Restore GEOS format file using BLOCK-LOAD command  
06 Set limit, pointer to correct byte in block  
100-140 Install pound sign on disk  
140-155 Install over of overfilled operation  
160-170 Restore GEOS  
200-265 Check for disk errors

### GEOS UK ORC

The program to change the ZIP CITY A personalised version of GEOS in also more meaningful English is very similar in operation to the previous program GEODIV UK, should be typed in as a normal Basic program having referred to the LISTING article here. Make sure that you SAVE the program before you attempt to RUN it.

When you are ready to make the alterations to your GEOS disk LOAD the program GEODIV UK, but don't RUN it.

Place your GEOS disk in your drive and then RUN the program. Your GEOS disk will then be altered. This will take a couple of minutes. You will be notified when the program has finished.

GEODIV UK works by changing the parameters for the window layout and printer format inside the GEOS disk.

The Basic program works in exactly the same way as the BASIC program except that it doesn't use pointers to the file, alters it and then moves it to another position in the file, and alters that.

The text alteration changes the window layout parameters. The window alterations (105-109) made in the previous edition of the program.

GEODIV UK and BASIC UK can not be guaranteed to work with all versions of GEOS and GEOSdiv UK therefore stress the importance of making sure that your disks are backed up before attempting to use any of the programs presented here. Your Commodore will not be held responsible for average overwriting of your disks.

See listing on page 87

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# Jinxter

**J**inxter is Megawatt's burly follow-up to the *Game and Guilds* series, a game that has won the most praise from adventure gamers. Jinxter, because of their presentation and performance on 16-bit machines, was the first rated computer for the Atari ST.

Like *Exile*, it compares that MS takes after its parent, even that game's top on packaging. Besides two disks, it comes complete with some various movements, documents, *Merle's* a quick guide to some of the important commands, a copy of the *Magpie* (Independent) Chronicle, a sport newspaper, and a Department of Securities form of Merle.

In the middle of all this verbiage, the keyword commands, however large that's enough about someone - EDI. The instructions word covers a lot of what you might want to know about the game, but as far as your average player can make out, and what you really don't see the usefulness of the chosen words, the game has something to do with a love letter!

The hero's in question is named - the much vilified Doctor of Jinxes, a beautiful model to the people of Aggroville, smaller as it is capable of increasing their physical capabilities of back. There the message is to be, departing the normal rail, but the brackets in the non-removable hands of the treacherous Grace Miribel, and appointed a bunch of characters with godlike powers, who are supposed to be given - in a way - and by the way, a whole bunch of adventures, vamps of back to the people of Aggroville.

Sadly however, an anti-bracket spell has been bestowed by one of the witches and an ancient wizard of charms (for it is a charm book) that goes from the brackets have gone missing. Without the charms, the doctor will not function. The role of the poor unsuspecting mortal who picks up the job of leading all the lost is to fill back the power of the witches and return back to the kingdom.

Brackets like a beautiful, dull words-and-maps, plot device it is in fact Jinxter doesn't go as soon that way. At the start of the game you find yourself on the way home on a road and a witch's hut. The road is a maze, quite a long one too. By my 212th move I still hadn't encountered anything more maze, than a few rather odd hallucinations - I've encountered some since a few bits of "Special Area".

The fact is that this game really rather resembles



Handled it and led the doctor's adventures through the Aggroville world of Jinxter on Megawatt's first rated computer for the Atari ST. My favorite feature is the department of securities, the special form (ST) (ST)

You might get a long way into Jinxter but a good command is not a problem. This makes the game, and most of the instructions in the adventure games, for a system to be given. An excellent idea of Jinxter, which is a good thing, but let us look at the documentation. There are two books provided for each puzzle in increasing order of explanation. The more the better, you simply have to type a lot of double letter combinations into the computer and will be told what to do. Unfortunately, for those who don't want to be told, the role of each problem is not a hard to find!

Which is where any quibbles I have come in. Experienced adventurers may find this game a little slow to get off the ground, besides being a bit of a guesswork game. For a start it across the disk a lot of use to using a GUI that gives you a lot of useful hints. And when I say a lot, I mean a lot - the demo program needs a disk and really give you an excellent set of a lot of panning. Doubtless this was a great idea when implemented as a 16-bit, but doesn't fit the mood and on a GUI. At least you can turn the graphics off - they're pretty, but unnecessary.

It takes a bit pointing on players - I have little patience with games that have you constantly UNLOCKING things, the idea of OPENING things, the EXAMINING things, etc., what's needed. It doesn't give much of a goal, and it's very noticeable as some games do to assume that I CAN & mean OPEN as well, and some, in the middle there, at a disadvantage of the controls as well. No Jinxter, as it there wasn't enough of all this mucking up, the most important of all is that the game really blow that off by itself. The only way to get course OPEN is again from a GUI.

Still, the puzzle's pretty good. The game gives up that and by packaging and documentation are given. The only problem is that slow disk combinations. For that, it's, I'd say, a few points off the rating. **T E**

**Paul Hines**

**Full Name: Megawatt Computer Games, 5, 10th, 10th Street, Aggroville, Lighter & Son, 10th Street, 10, 20, 10th, Tel: 01 278 5771 Machine: C&G Price: 189.95 (incl. postage)**



In the middle of all this verbiage, the keyword commands, however large that's enough about someone - EDI. The instructions word covers a lot of what you might want to know about the game, but as far as your average player can make out, and what you really don't see the usefulness of the chosen words, the game has something to do with a love letter!

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# The ICPUG Column

The third column in a regular series of K.P.U.s -  
Britain's biggest independent Commodore user group

By Tim Arnot

In my last column I talked about data transfer between machines, specifically the 64/128 and the Amiga using asynchronous RS232 and Kermit or Nodemim file transfer protocols. Not long after I wrote it I had a phone call from an ICPUG member who was trying to do exactly that - except he was using the parallel port on the 64 hooked up to the parallel printer port on the Amiga.

Thinking about it this is not an unreasonable way to go about it, and it's certainly cheaper than buying an RS232 interface for the 64, especially if you're in the stage of transferring files. A nice machine was at risk to be in someone's danger of selling the old one. There is a problem though. The parallel printer (PRT) on the Amiga and indeed on any PC is an output device only. It can't send data from the host computer to the old one but not vice versa.

In a strange coincidence the Amiga's general I/O chips (82C01 and 82C02) compatible with the 6305 are a 64. Both are called CIA's! They require in a position to support the busless device drivers and programs the hardware depends on. In fact BASIC, the code it prints much abnormal for both machines - with the addresses here, been changed to protect the innocent.

## Heh, Heh ...

Now, what I am proposing here is, naughtily, simply speaking with its multi-tasking rationale behind Amiga's strong disavowal of them backing the hardware driver's - what if some other task legally tries to use PRT? OK, I plead guilty here, but could you, OK, and what Amiga 82C01 can't do. Just

64 Address	64 Register Function	Reg. Name	Amiga Register Function	Amiga Address
\$0000	SERIAL BIT (DMA 1-8)	FRA	DPK CONTROL (DMA 1-8)	\$000000
\$0001	USER PORT DM07 (4-8)-212	PRB	PARALLEL PRINT-ER DM0-03	\$000100
\$0002	DATA DIRECTION (0-INPUT)	DDRA	DATA DIRECTION (0-INPUT)	\$000200
\$0003		DDRB		\$000300
\$0004	TIMER A	TALO	TIMER A	\$000400
\$0005	TIMER B	TAHS	TIMER B	\$000500
\$0006		TBLS		\$000600
\$0007	T O D - C L K - R	TEPH	PAGE	\$000700
\$0008		TEODT		\$000800
\$0009		TEODS		\$000900
\$000A		TEODM		\$000A00
\$000B	Serial Data Register	TDODC	No Control	\$000B00
\$000C		SDR	Serial Data Register	\$000C00
\$000D		SCR	Serial Control	\$000D00
\$000E		CRA	Control Reg.	\$000E00
\$000F		CRB		\$000F00

6501 (64) and 6502 (128) Parallel Register Map

make use, nothing that crosses the printer while transferring your files.

The actual programs, well I'll leave you to write them for yourselves, but I will give you a wiring diagram for the two parallel ports, and the relevant register maps.

Next time I'll talk about ICPUG at the PC 9 show, and how it's possible to access Commodore without using a

64 128 or Commodore module. See you on the 3rd April.

For further information on the ICPUG contact: Rick B. Cook, Membership Secretary, 30 Bransford Road, Newbury Road, Houndmills, RG10 2EP. Or, write or telephone to ICPUG at 118.



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# ARTIFICIAL INTELLIGENCE



AI—is it within reach  
of the humble micro  
or is it just  
for the big boys? Read on

By  
Mary Branscombe

**T**he problem with Artificial Intelligence for AI as it is also known is that it means a great many things to different people — certainly not a word as an AI system is likely to change as our conceptions of AI become more definite for AI itself, less ours!

As a result I have decided to concentrate on one particular language — LISP — the language central to the whole development of Artificial Intelligence and also, incidentally as a one in the latest fourth generation languages — FG/Like that! Of course there have been examples of other languages already stated for AI applications — namely Micro PROLOG and its programming systems, such as Smalltalk for VAX and PDP computers, but these are derivatives and can be seen as having their roots firmly embedded in LISP.

LISP is a language of contrasts. As it is one of the first "academic" languages it is still looking forward, and because at its heart is a good open system processor, it has found itself respected in the world of AI.

LISP has more in popularity since its completion as a full machine code compiler back to the sixties. Due to large amounts of money being poured into the design of a fifth generation computer it is likely that within the next five years we will all be as familiar with an expert system as we are with the wordprocessor today. Already, with commercial applications of AI research are in common and today, taking one on the fifth-floor taking the stairs and taking from a variety of writing at a steel rolling mill as a control the vital combination of an old hand.

A doctor has commented his lifelong working knowledge of brain growth to an expert system as they use LISP as a fixed and processing package to analyze how a doctor finds a brain case.

The applications of AI are all around us and like the so-called "systems revolutions" the acceptance of AI is taking place very quietly, not behind our backs, but right under our noses.

### LISP as a Macro

So where do macro based LISP implementations come into all of this? And more to the point what possible impact can a macro-computer based version of the language do as a field of computer science rapidly gaining momentum? The answer is quite a lot.

In order to look at AI we have to look at the way we consider the subject, the way we consider things that possess "intelligence" — the present's view of intelligence is likely to be directly at odds with another view. Some people think that the computer is "intelligent" when it plays a game or in a game of chess, other people think such an approach is naive this morning, but the fact is it is still possible to program a computer to beat a world master at his own game!

Macro PROLOG is another language used in AI it is a language designed to work on the same programming structures as LISP that is using a system of logic commands termed as predicate logic. But whereas macro PROLOG is better suited to the logical programming approach we have grown to know and love in languages more down to earth such as Pascal and C++ LISP has taken a radical new angle on the subject one which has tremendous applications in the world of AI, and that is "symbol manipulation".

It is more intelligible people's opinion that the very thing that makes us intelligent is our ability to abstract symbols (find a common feature) and represent that symbol in another way. That is known as "learning" when we get to the stage whereby we can make

assumptions such as "The car will be there" and so on we are dependent to rely on some data being fed to us which we absorb and can provide such decisions as "what the sign on the road means around the corner".

This is called "predicate learning" and is one of the greatest stumbling blocks in the world of computer science because the next step we take will force our line of research in one direction or another. In order to achieve the "intelligent machine" we must make the right choice. Do we assume that "predicate learning" processes are defined by a set of rules by deductive processes (no learning) and learning is made possible by a series of questions to which we are given inputs. On the other hand do we assume that the ability to manipulate large quantities of symbols and recognize that information as another way is indicative of "intelligence".

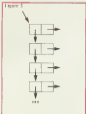


Figure 1: Another way of looking at data items — concept of information stored and retrieved via a tree. This makes it ideal for use in databases and Figure 2 shows a machine more like graphical databases.

### Quite a Problem

LISP is a computer language designed to symbol manipulation. It has a magical ability to display alphabetic strings. This is essential so that somebody could write an arcade game using the language, but the main strength of LISP is its ability to process large volumes of data.

### Physical Bodies

LISP is really unlike BASIC in that it works on the values of pointers.



Figure 2: This structure allows you to create a sequential path within a LISP. This forms the basis of many top programs.



which is used by many of the non-artificial intelligence languages such as PROLOG, by typing in:

```
COLOURS
(RED WHITE BLUE)
```

LISP will reply by returning the formal data given which will be COLOURS and (RED WHITE BLUE) however if you took away the single quote mark the LISP interpreter will return the error message UNDEFINED. You can give a variable a name by typing in a constant using a constant called LETQ this gives a variable a value a bit like the LET statement in BASIC.

```
SETQ COLOURS (RED WHITE BLUE)
```

As can be seen the value to be stored in the variable can be either a literal expression (preceded by a quote mark) or a reference to a LISP function (known as a "command" or by word in BASIC). Alternatively the name of a variable without a quote mark the value assigned by the SETQ command will be produced.

As with many PROLOG LISP requires a completely new approach to the way we program. To the extent LISP and many PROLOG share many similarities, and even a few more in the language constructs itself, but we have to think again about the "logical flow" that the flowchart has modified in a programming language and to however being continued in programming languages such as BASIC, FORTRAN and the like.

Consider a list of information in memory of a number of items, each of which except the first has a successor. LISP writes in terms of an array of objects which can be referred to in a uniform way irrespective of their length. The idea that lists can be traversed by stepping along them in one direction is a nice help, mainly.

LISP also allows structures and numbers to be mixed fairly well with lists. It is a matter of skill or familiarity in using the program.

In the case of lists, these pointers will already understand and form of data (usually) such as the list which contains a list pointer. The left hand pointer first in the list leads to the first element in the second list while the right hand one points to the remainder. So for the list (ABC 12) we get the pointer in figure one. Such lists can be represented through lists or wherever they're such

as the illustration in figure two.

Now it is probably clear why LISP is such a good general purpose device in processing language as it has nearly all of the functions and data structures inherent in a database built in to the structure of the language.

### Tests and Comparisons

The ability to define a function so that by means of a simple call structured information may be built stored or retrieved or otherwise processed as an arbitrary piece of data is a common feature of LISP. However far more interesting programs can be produced once functions are written capable of doing what some people might call

comparisons with conditional expressions built up using the special function COND. The general form of such expressions are:

```
(COND
 (predicate 1 expression 1)
 (predicate 2 expression 2)
 ...
 (T final expression))
```

There can be as many or as few predicate expressions pairs as required. When LISP finds a COND expression, it starts evaluating the given predicates in order. The value of return is that of the expression which is paired with the first predicate to hold a "true" (i.e. the first expression to be returned with a non NIL value).



intelligence, considering equivalent data from a function and making decisions about what to do next on the basis of the function's heading. In other words LISP needs to make tests and comparisons between data.

The most common tests EQ, ATOM and NULL return values which represent the boolean values "true" and "false". In Acornsoft LISP NIL is used to represent "false", as well as the empty list such as the blank list found at the end of a data structure diagram. "True" is considered to be any situation where the data returned from a function is not "false" (that is to say the word T to represent the question, otherwise I could list as "file", "computer").

LISP functions that are thought of as returning "true" values are known as predicates. Their main use is in

in the previous example, the constant T is used as a final predicate. Since this always holds, the value "true" (the corresponding final expression) can be used as a default. The result to be returned in all of the other predicates is therefore "false". Thus, expressed without the brackets, the conditional form can be read as:

```
IF predicate 1 is "true"
THEN return the value of
expression 1
ELSE IF predicate 2 is "true"
...
ELSE return value of final
expression.
```

When LISP requires composite predicates, it can build them up using AND and OR. Each of these functions can cope with an arbitrary number of arguments. They evaluate these arguments one at a time until the

normal rules of logic allow them to return a reply! Then AND will evaluate a requirement until it reaches the goal of the (and) returns T or an error if one of its arguments is false that one of its arguments evaluates to NIL.

OR will stop evaluating and return T as soon as it finds a non-NIL argument. Places of LISP code which seem to require a complex run situation of COND, AND, OR and NOT are usually best written as groups of smaller functions.

### The LISP System on a Micro

When you write a number of functions using LISP you are forced to make mistakes after all that is part of the fun. Connected with computer programming. Writing LISP means that an error a number of things will occur.

Your system will return and up making total nonsense like the word kind of error, or if you in luck you will be greeted with an error message, and a confusing collection and list of LISP expressions.

This list is called a 'back trace' and is supposed to help you with debugging although some microframe LISP systems use the back trace to make colored 'green' at what the error is, and where it is most likely to be.

One of the first actions upon getting an error message is to check whether the error really is an error and not just an unexpected result, an example, unless human intervention is on behalf of the computer.

Once you have traced the logs of the program by using the data structure diagram (as all things written round the disk, the progress of the data in the second step to be considered as back). The fun really begins, and where LISP thankfully enough attempts at being able to help in isolating an error as you can examine all of the questions ever posed in LISP functions and all the values that can ever get returned as results can be read and printed.

The only time when you cannot examine the progress of the functions where problems occur with functions entry points and with recursive structures such as breaking out of a loop structure by direct return (as for like using a GOTO made a FOR NEXT loop).

When all else fails, it is time to pull in the heavy guns in the form of a function called TRACE. This can be used to see how values get passed

between functions in a complex calculation. Again, the object of using it is to isolate a single function returning incorrect results, and to examine arguments which lead to such behavior.

If the bad function is a simple one, then it will be easy to correct. The error trace the program and try again. However, if it is a function that is left open to the programmer is a long night sitting over a dry run sheet and a lot of paper.

### LISP and AI

AI consists of a number of apparently diverse areas, some of which have been listed at One in particular was the analysis of data trees and a simple type of game. This can be taken further to imagine what happens at the tree grows bigger, the number of branches so great that they start to interact, to produce a loop in the tree structure. This latest idea is used in the 'chess concept' whereby a small robot is placed in a maze, and is given hints to let alone to learn about its new environment.

In this example the mouse is left to make a pathway in order to get from one part of a maze to another. If the maze gets fairly complex the concepts of examining the possible movements. This same concept has been used in databases and even in a special version of chess, to find the quickest way of getting from point A to B. This could be used to develop fast search operations. LISP has been used to write wordprocessors and word editors in its goal.

A famous LISP program, written merely as a joke has become a successful addition to the LISP system and is great for breaking the ice at parties! Called ELIZA it is a simple program and uses a vast collection of commands and operators sometimes the results can be stunning.

Operator:	My father hated me.
Computer:	Tell me more about your father.
Operator:	I remember an unhappy childhood.
Computer:	Do you often think of your unhappy childhood?
Operator:	No, I can't.
Computer:	Tell me who you can't.

This is a version from a typical LISP dialogue and as you can see the operator is already opening up his heart to what is essentially a plain, but with a 'Y' on top of it!

It could be argued if ELIZA has

any therapeutic value, especially as the operator eventually gets annoyed at the lack of feedback, not questions and no answers. But to begin with we are willing to tell all to converse, ourselves, then there is a compassionate thinking behind the computer screen and the results will be a lot more than our demands from AI than what we originally think.

I hope that this gives you, last point. The fact that AI also relies on the fact that we are willing to attribute intelligence to a series of rules and statements for at least some of the time. Regardless of how a piece of software is written, if it at least gives the appearance of behaving intelligently, that is enough for some.

LISP will not have most computer into a silicon prodigy, nor will it ever hope to compete with complete applications such as systems and word structure analysis (as is being provided by the Lotus corporation for a 'center check' to check central structure for bad use of the English language) but what LISP will allow is some fairly comprehensive database and text processing programs to be written.

In addition to the LISP is perfectly capable of supporting a full range for direct text entry, as it can find itself applications to capture screens and sometimes and modifying programs that require aspects of the real world to be simulated. Again LISP is the ideal front end for this, perhaps 70 per cent of the time, could be successfully work conditional comparisons.

I have seen a chess program being written using LISP. Although this is purely an exercise it should give an indication as to just how difficult applications can be written using LISP.

For most down to earth applications - or at least those which are more suited to the micro with LISP are for writing complex algorithms and with its advanced features (based normally only on compilers such as 'Golden Common LISP' for the IBM PC and MS DOS machines, or MAC LISP for the Macintosh on main Cambridge LISP for parallel VME processors) a good deal more than can be done and perhaps possible. Not to mention educational establishments that are starting to teach micro computer based production programming structures in LISP or C, Pascal, and I mention no others.

# First Steps

*Clear thinking and cleanliness form the key to creating a suitable environment for learning about your computer*

*By Norman Doyle*



**T**he normal reaction to change is resistance — there's a bubble in everyone just bursting to get out. Change and necessary progress is inevitable and the machines of the New Age will be tremendously

A major stumbling block to the learner is the fact that one instance used for the overview of the new, the experts proceed to show the door and he is left with thousands of pages. Familiar service operators quit storage and new games, the commonplace becomes installed and necessary. Take the simple act of learning on the computer. If it were a television or a light it would simply be switched on but computers are powered up, booted or placed into operation inside. Later the user suffers of a couple a mile of terminology back the hall of mirrors from the computer's point.

Fire and curiosity are the driving forces of change and computer technology have followed the level and speed rate to experience by relying on technology and black volatility a computerized, so has the path to the computer. Even as a technically-minded person at last, one starts, starts to pick up the courage to delve into computers, and avoid the confusion described.

By way of a caveat use this great feature of the computer and the user's articles will take you back to the very basics and drag you kicking and screaming into the brave new world.

Practically you have already taken the first step of having a computer. Probably the choice was made perceptibly on the basis of technical advances and ego. The machine would be accompanied by an

"user" introduction to computers has the volumes of introductory books available before the cry that out look or all you need.

Inside the machine there are dozens of delicate electronic circuits but the books deal with routine maintenance. The current fashion has many finished cases and grey plastic means that it is not long before your shiny new acquisition becomes a quack under stained dust trap. A quick look of a feather duster may remove the surface dust but the computer is riddled with holes for ventilation, sockets and spaces between the keyboard buttons which all get in dust.

If you do never had the urge to examine the insides of your Commodore I suggest that you disconnect it from the mains for a week if it's been used recently, and carefully remove the lid. What will you see? Dust.

At first once a year you should give your computer a spring clean. The circuit boards are very low voltages and dust can form an extra electrical pathway, which may eventually lead to trouble. Circuits are delicate and coated in a protective thin oil layer. The jacket is just like the Teflon on a car, that stick pans rub too hard and it won't last long.

The best way to remove dust is to use a puffing brush such as the type used in most photographic stores. The use of a compressed or atomized can be useful for inaccessible areas but take care not to spray directly onto the circuit board. The compressed gas often liquefies under pressure and a damaging spray of wet cold liquid can

destroy it if the container is held at the wrong angle. Always follow the instructions given on the can and do not use an aerosol with a flammable nozzle extension to avoid trouble.

The outside of the casing provides an easy problem. Even the cleanest hands produce positive oils and grease which can prove stubborn to remove. Used frequently a cloth dampened in soapy water will remove most of these stains. Make absolutely sure that the cloth is only damp to the touch and any water leaks made to the circuitry may ruin and up with a clean but incorporate machine. Motherboards can be removed with a non-abrasive green but again ensure that only the absolute minimum is applied and clean off with a dry or slightly damp cloth.

The computer ports (sockets) provide their own problems. If you don't have a fixed work area where the computer system can be permanently connected the ports will make more than their fair share of wear and tear. Even under perfect conditions the use of cartridges, modems and other equipment will result in the gradual wearing down of the connector strips. Always ensure that these are clean and grease free because any grit will aggravate the problem. The best applications for this purpose is methylated spirit or even lighter fluid. Both of these are highly flammable liquids and must be kept away from naked flames.

The Clio and First 4 have their own problems because of the connectors, have three unshielded DIN plugs. The tiny pins can shear off if too much force is applied and constant plugging in and unplugging increases the





# Sonus MIDI Music

When you want that sound of a recording (or want to produce it), MIDI comes in handy. It's the digital equivalent of the MIDI 1.0 you already know, but it's more powerful. It's a new way of thinking about MIDI, and it's a new way of thinking about MIDI.

By Joe Wiegman

Some are a little bit surprised at the name of the MIDI-based software that has just been released by Sonus. They are a well-known and much respected name in MIDI software, and they have released this MIDI 1.0 software for the Windows 95 MIDI hardware for the Windows 95.

## For Hardware

Just as Sonus' MIDI hardware is a great addition to the Windows 95 MIDI 1.0 software, the software is a great addition to the MIDI hardware. The MIDI 1.0 software is a great addition to the MIDI hardware, and the MIDI hardware is a great addition to the MIDI software. The MIDI 1.0 software is a great addition to the MIDI hardware, and the MIDI hardware is a great addition to the MIDI software.

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## More Features

The MIDI 1.0 software is a great addition to the MIDI hardware, and the MIDI hardware is a great addition to the MIDI software. The MIDI 1.0 software is a great addition to the MIDI hardware, and the MIDI hardware is a great addition to the MIDI software.



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expansion are also in the mid-levels, especially the Series 10000 computers. These are not expensive, but they are powerful and useful, and great industrial standard equipment. To get the most out of them, you need a MIB. So...

Control is the heart of an auto-control system. The auto-control system is the "brain" that manages a factory, such as in the oil well or steel-making application.

The Basic Move System has Control with a control system. Control means that you can do manual and automatic work, and control is the responsibility to manage work.

Operation can be applied to a hierarchical or linear structure, sequential and linear. In the hierarchy, you do a sequence of tasks to make a product. Each sequence is called a module. In a linear structure, you do the next operation, and you do it again. The control can be hierarchical or linear, or a combination of the two.

The Basic Move System can be used in a linear structure, such as a sequence of operations, or a hierarchical structure, such as a sequence of operations. The "Basic Move System" can be used in a linear structure, such as a sequence of operations, or a hierarchical structure, such as a sequence of operations.

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—Steve Schmitt, Green Valley, IL



System Features Group which are not tied to a specific hardware, such as the Series 10000 computers. The control can be hierarchical or linear, or a combination of the two. The "Basic Move System" can be used in a linear structure, such as a sequence of operations, or a hierarchical structure, such as a sequence of operations.

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Control is the heart of an auto-control system.

—Steve Schmitt, Green Valley, IL

Bank A	System B	Bank C	System T
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

Main Menu from BASIC

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## MIDI Processor 64

All in all, the Super Sequencer *is* excellent programs. The Super Sequencer is certainly the most comprehensive, but it comes with one or two lack of a real editor. Now such editors involve getting down to the bits and bytes of MIDI data and may not appeal to everyone but it could save a lot of time and trouble if, for example, you needed to correct particular notes on an otherwise perfect sequence. Both an editor on an audio recording would require a re-take or a patch-in and you can use the Super Sequencer's write patch-in feature to do this.

Soavi's MIDI Processor, however, lets you do this and more. It's a stand-alone program but it can load and save SuperSeq files. It can be used to examine MIDI data and make unwanted program changes, pitch and note wheel data. It can also "alter" a program which involves changing information on a given channel and putting it on another track.

It has its own metasequencer so you can record additional tracks and then to your piece although its main purpose is to test the results of new edits. The Range-Find feature lets you walk up just a range of notes rather than a complete track or sequence.

## MultiTech 64

Some describe MultiTech as a monitor/sequence editor whereas it is a MIDI data what an assembler/monitor is to monitor such. While really doing among the best and the best in MultiTech as most information is displayed in boxes which should give computer users less of a headache than windows.

MultiTech can be used as a sequencer, and it does support MIDI data in its role. It can load, for example, load in a Super Sequencer file, save an event and allow it to be edited. Now the screen was all doing things, it didn't but it illustrates the program.

What practically it can be used to create a MIDI dump request from musicians without a manual dump on or there from just with a user's CE 144 (1) Dump Request included on the program disk.

MultiTech also has a 128 byte Trigger Buffer which holds a series of data it must receive before it begins

recording MIDI data. This would be used to start data recording after a certain event had been established such as the end of a note wheel or a program change.

There are selectable MIDI files, capture Play Through and editing features.

MultiTech is a fascinating program unlike any other MIDI program I've seen. The average — and even the super average musician may never need to use an assembler as the MIDI Processor should do it for you. A MIDI technician, however, or data hand will have a field day and someone who's wondering to know that a program like this exists. You may just need it one day.

## Score Track

Most MIDI sequencing programs display the notes they record as a series of numbers. They are generally quite easy to edit but it's often useful to be able to see the notes as traditional notation.

Score Track does just that. In fact, it's a self-contained sequence program with real and step-a-line input. It was written by Gerhard Langlois who wrote C-Lab's programs and it brings all users by displaying a C-Lab logo in the Edit screen. Operation is with single key commands — as opposed to Soavi's multi-menu system — and it's a very easy program to use.

You can record 64 Patterns each with up to 16 tracks, and arrange them into a Song containing up to 256 Patterns. There is a mixing function so the same pattern can be used in different positions with different tracks playing.

The disk system is a convenient program so you can load Super Sequencer files. There are facilities such as track-stopping and bouncing, quantisation, transposition, ghost tracks and a cross delay system to get tracks and drum tracks in time.

Recording takes place in the Song and Pattern screen. To use a track in traditional notation you go to the Edit screen. The music is shown on a staff and here edit and below the staff are options to allow various parameters which affect the display. These include quantisation, maximum note length (up to 1600 ticks), timing during manual overlapping (maximum to set the maximum note length) and

transpose. The screen updates after each keypress and you can see how the alterations affect the music.

Beneath the staff is an event editor which shows the time of the start of the event, the note name and duration if it's a note or any associated parameters if it's not. The cursor on the staff is linked to one in the event editor so you always see how the two fit together.

You can enter notes and define notes and events, and although you can make a piece directly on the staff (especially by directly entering notes) if you use first-year way around a keyboard you can probably enter a piece just as easily or more than the Pattern screen.

The print option defaults a dump of what's on the screen.

Unfortunately the staff has a range of only four octaves and although notes outside that range are shown in the event editor they appear on the staff as rests and are printed as such.

In spite of its limitations, there is a limit to what you can get into a 64K, when all — Score Track is a nice program and if you like to see your music in traditional form — an IDE, it can be recommended.



## Voice Editors

Some have a range of voice editors, many of the most popular are transformations on the notes. Voice editors save three functions: Events, as most within are digital, programming and usually digitally requires the advantage of doing (possibly hundreds) of editing parameters. Quite often the edit display on the synth is a small LCD which can only show the value of one parameter at a time. With three matrices, it's not easy trying to work out how a sound is constructed.

Software can help by showing all the parameters together on one screen — or several screens if the synth has as many parameters — and by translating some of the numbers into graphs, envelopes and waveform shapes, for example.

Secondly, the voices can meet words and be arranged to banks and you will often want to load a selection of voices into a bank in a particular order. Trying to arrange voices in this way on the actual bank can be very hard work, indeed but with a computer it's a doddle.

Thirdly, some editors for you save cases data to disk. The usual method of storage is a plug-in RAM pack, or a dump to a cassette. In terms of their convenience — and in terms of RAM packs — a voice editor such as ours pays for itself several times over.

### Case Programmer Librarian

Like Sonus's other programs, the CE/PL Case Programmer Librarian is driven from a series of menus called up with the function keys. Edit and CTRL. The program can store two banks of 48 voices and has a word buffer. You can load and save a case to and from these the CE/PL word bank. The programs banks are called Cartridges and to be confused with the CE's RAM cartridge.

You can swap voices from bank to bank and buffer to buffer with the press of a few keys. Some of these steps are automated from sub-levels of the menu and require three key presses to activate and then a confirmation 'Y' or 'N' so you don't oversize. You do get used to the system after a while, especially after using the Sonus sequencers but I wonder if a slightly different approach could have made the process simpler.

The Edit Screen shows all the current parameters at a glance, although you have to press Space to swap between DCH and DCHP. The layout is not arranged in the same order as the words or the Case CE patch chain — and hence the normally accepted method of writing voice parameters, and slight though the difference it makes copying patches from chains just that much more difficult. The data is displayed purely as numbers — there are no graphic reinforcements — but it is fast, although some voice editors have graphics need close.

However, once you get the hang of things — and a little familiarity goes a long way — the program can aid programming immensely.

Compared with the price of RAM cartridges the program cost will quickly be recovered as you can store any number of banks of voice-parameters to disk. The CE/PL disk

contains 10 banks of 48 voices so that's a nice plus. Case Digital Dubs are also available containing 80 more banks of voices and you can buy patch chains from various sources which you can type into the program.

### DX-TX Design

If you have a Yamaha DX or TX 2, 3, 6 or 10-track or expander then the DX-TX Double Banked Librarian & Programmer — to give it its full title — does just the same amount what the CE/PL does for the Case CE's words.

It uses the same sort of function key menu system and displays the parameters (naturally) over three screens — a short list of parameters, the DX/TX layout, if it can hold two banks of 12 sounds and includes an AR computer menu. The disk contains eight banks of 12 sounds and a DX-TX Digital Disk is available containing over 300 sounds.

### FB-01 Design

If you have a Yamaha FB-01 and want to program your own voices then you must have some tools or logic as the FB-01 lacks the necessary buttons to be programmed by itself.

FB-01 Design retains the Sonus function key menu features and lets you do to the FB-01 what the other editors let you do in their respective instruments.

### ESQ-1 Design, TB12 Design and DX21, 27, 100 Support programs

There are for instance's ESQ-1 Synth, case Yamaha's TB12 expander module and Yamaha's 4-operator DX21, DX27 and DX100 synthesizers.

### RV11/20 Librarian

Here's something slightly different — a librarian for a drum machine. The program contains over 190 patterns including jazz, latin and rock etc. You can edit and save patterns and notes and add a 30 line comment to individual patterns.

It is menu driven, Sonus style and displays a grid showing which patterns have been recorded. There are no facilities for composing new patterns or songs which is a shame — it is surely a Librarian after all — but it is more useful and convenient than storing songs on tape.

### Sonus Editors

Two of Sonus's most recent programs are Sonus Editors for the Extended Memory and Sequential's Prophet. These are mono-driven waveform editors which display waveform and program parameters and let you step through the samples page by page to find the best looping points. You can also draw your own waveforms directly into the system.

You can store sets of 78 sounds (each containing a single page waveform and 76 preset parameters) on a disk and a library of 78 pre-programmed sounds are provided.

### Sonus Demo Disk

Finally, if you prefer your information to be presented visually then the Demo Disk lists the features and gives you screen shots of eight of the more Sonus programs. None are interactive however but you can take advantage of Sonus's special 14-day money back guarantee to make sure that the program you buy does what you want it to. Contact Sonus for more details.

### Summary

The Sonus programs are well-organized pieces of software, although some of the basic Editors though functional could have been more inspiring. The Sequencers and Score Think especially are extremely worth a close look if you're after some first price of MIDI sequencing software.

You can see that Sonus is dedicated to supporting the Commodore's mass personal Wave to them for more details of their products or speak to Rosemary, one of the most helpful people in the line on the other side of a telephone. Sonus have many special offers if you buy two or more of their products.

The Commodore 64 and 128 will have a lot going for them in the music stakes and the availability for the Commodore of software will hopefully encourage anyone who has not yet taken the plunge into MIDI music to do so.

### Tim Allen

Supplier Sonus UK, P.O. Box 17, Hockingham, Norfolk NG11 4EP. Tel: 01353 781000/Commodore for prices.

# Extended Backgrounds

*Extended background mode opens up many possibilities but only allows the use of 64 characters. Until now*

*By Paul Williams*

**T**he Commodore 64 has many different graphics modes but the best published is the extended background mode. This enables characters to have background colours which differ from the selected background but only permits 64 characters to be defined.

This user mode program allows an text or text-defined graphics mode to have a unique background colour for each of the 25 screen

lines, but still allows the use of the full 256 characters in the character set. It works by intercepting the teleprinter raster scan so that values in the VIC chip can be altered.

To use the routine once it has been loaded with the Basic loader program *Extended Loader* call \$1549%0. The 25 line background colours are then defined by the values of locations \$12 to \$58 in memory. POKing to these locations will instantly change the background

colour of the corresponding screen line. Foreground colours are set in the same way as before - either using the control-colour keys within PRINT statements or by POKing to the colour map at \$D296 to \$D299.

To demonstrate the use of this mode you can type in *Extended Demo* and see what it does.

*See listing on page 64*

## C64 PROGRAMMING

# Gyrospeed

*C64 tape turbo*

*By Gary Saunders*

**T**ransfer your existing single pass programs (Basic or machine code) to tape or disk to turbo tape with *Gyrospeed* turbo tape facility. Any BASIC program can be handled easily but machine code files should not load into locations \$1004 to \$1040 and \$1744 to \$1744. Apart from that, you should have no problems. The final program can then be loaded from tape up to twice into the normal speed. For disk users the included a directory database, which no doubt will come in handy as to find the start address of a specified program.

The title screen has three options to choose from. If 1 takes you to the loading menu screen. Now follow the on screen instructions to load your required program starting the teleprinter and if using tape or disk where

required. Machine code programs also need the ram address (by using the \$15 address which starts the program), e.g. machine code program which loads into location 49152 onwards is normally started with \$15 49152 etc.

For disk users it is a good idea to make sure that all SYS calls to machine code files call the start address as in the example above. You then won't have to remember all those SYS calls as the directory database will list all PRG type files with their own addresses in memory.

Once the required program has loaded, pressing space will return you to the title screen. If you now save the program to tape or to be formatted then saved you can return back to the title screen to save more copies if necessary.

or load other programs on your P1 to quit the program. All turbo programs will restore when loaded.

### Getting it all in

The program is presented in the form of a BASIC loader and should be either typed or loaded in after the following line has been typed.

```
POKE 49152 POKE 49152 POKE 49152
PRINT NEW
```

Once run the BASIC loader will generate another BASIC type file called *Gyrospeed* and save it on to disk. If using tape then read the BEM statements in the program.

The program can also be loaded like an ordinary BASIC program.

*See listing on page 66*

# CP/M Assembly Language Programming

*An in-depth look at the CP/M+ Operating System*

*By Paul Schofield*

**I**f you are a regular reader of *Byte* magazine, you should already have a fair amount of the lessons offered by the CP/M+ Operating System. If this has prompted you to experiment, you are now no doubt well aware that after knowing CP/M, all you see on the screen is A >. That is not terribly interesting, so we are now going to use a simple little program that will make CP/M display a menu of the program files on the disk, and let you select one by a single key press.

## Assemblers and Compilers

Before you can create any CP/M programs, you need either a Z80 or 8080 Assembler or a high-level language compiler. The latter of course is very much easier and for around 100 you can buy a top class compiler such as PTL Module 2 or Turbo Pascal. As this is likely to be beyond the budget of many readers, we will stick to Assembly Language.

The assembler I have used is GEN80 by Haack. This is sold as a package called DEYFACED which also includes one of the best CP/M file

format editors and a first class front panel debugger. The assembler supports the proper Z80 and 8080 opcodes and pseudo-ops and has very powerful macro capabilities. As you enter L80 this package is very good value for money, and I thoroughly recommend it.

If you don't have this package but have a copy of M80 you can assemble the programs using this if you convert the DEYF pseudo-ops to INTEL style D8 D8. It is, of course, if you only have the Digital Research MAC assembler you will have problems. I experimented by changing the pseudo-ops and including Z80 LIB and got about 50 errors. Rather than finding all the alternate INTEL opcodes I would suggest that you use M80 to create the HEX dump and consider buying a proper Z80 assembler.

## Making a Program Auto-start

CP/M's peculiarity as an operating system has never had very much to do with either its facilities or user

friendliness. In fact in our ranks of the leading Z80 based operating systems it came last in terms of support for macros. Even in its area of implementation on a wide variety of hardware. However, with CP/M+ Digital Research tackled many of its shortcomings. One new feature was a simple means of auto-starting a program. The mechanism is very simple. During a cold boot the system disk is searched for the file PROFILE.SUB. If the file is found, an attempt is made to execute the command.

## A > SUBMIT PROFILE

To make use of this we need to make up a system disk with the file

```
CP/M+ SYS
CCP.COM
SUBMIT.COM
```

We then give an editor to create the file PROFILE.SUB which contains the

```
MENU.COM >
```

In future when this disk is formatted SUBMIT.COM will run in track PROFILE.SUB and attempt to reformat the program MENU.COM.

## Z80 Assembly Language

To those familiar with the 8080, the Z80 instruction set may at first seem a little strange. The main differences are:

Operand instructions have the form LD dest, source

Others in the 256 page instruction register, these can be used simply A, B, C, D, E, H, L or in pairs AF, BC, DE, HL. (The index registers IX, IY have not been used)

Gateway operators do not sit at the start but end so it read, be done explicitly e.g. OR A

Others are a few complex instructions e.g. LDIB, which is used for block moves and assumes that certain registers are present

## Creating a Program Menu

The intention of our program is to generate a menu of the program files on the disk so the steps can be undertaken as follows:

```
WHILE more files on disk
  find one
  IF extension is .COM THEN
    - display list and file name
  - ENDIF
ENDWHILE
get key pressed
start corresponding program
```

## Directory Searching

CP/M makes directory searching very easy for us by providing BIOS interrupt calls to do precisely what we want. Taken together we can know how to call a BIOS function, how to supply the information and where to find the information returned by CP/M.

Fortunately the first two of these are quite simple. To make any BIOS call we first set the function code in register C and the function parameter list in D placed in the register pair DE. Finally, we call the BIOS interrupt 00BH. A good example is provided by the subroutine CHECKOUT

at the start of the listing which is used to output a character to the screen.

For file related functions, it is clearly not possible to pass all the required information in register pair so instead we pass the address of a parameter block called the PCB (File Control Block). This is a standard CP/M structure of which we will see only a small portion in the listing and listing:

```
PCB: 1 byte - not used
      8 bytes - file type
      1 byte - file type
      21 bytes - not used
```

As we wish to find any .COM file, we initialise the value in the string register and change to "COM". We are now ready to use the BIOS functions 07 and 08 to find respectively the files and subsequent files satisfying the specification.

The register from CP/M is a single byte value in the A register which the manual tells us is either OFFH (no file) or an offset multiplier. The offset multiplier tells us where to look in the DMA (Direct Memory Access) area we will find the file data. The formula used is:  $000H + (DMA \text{ default address}) + 32 * A$ .

## Menu Display & Program Execution

Having found the program files, it is very simple to display the menu using the standard BIOS calls for character and string output and finally to act on a user input using CONIN. The one problem remaining is to activate the selected program. This is done very simply by a BIOS call which mainly requires the filename of selected file to be placed at the start of the DMA area.

As you can see from the completed program most of the I/O operations have been made very simple by CP/M and the majority of the code is devoted simply with calculating offsets to data and moving data from one area to another.

To date most discussion of the C128's CP/M Mode has concentrated on the range of business packages that are available. Little has been said, however about writing your own programs in this mode. While the forward source display facilities mean you automatically get complete source

and machine code given in the mode there remain several good reasons for writing your programming horizons. Consider the following:

- faster and simpler disk file operations
- very wide choice of professional program development packages
- limited programs can be used on a wide variety of computer systems
- large base of Public Domain software providing many useful routines

In this issue we are going to look at just some of the assemblers and compilers available for the C128 in CP/M mode. At present there are few UK studios stocking these but the two companies mentioned at the end of the article specialize in supply of CP/M and MS-DOS software at competitive prices. When ordering for the C128 you should state either the disk drive (not 1MB) or the MPROM format e.g. K&S/PRO II.

## Assemblers

Even if you intend to program mainly in a high level language an assembler is always useful for those odd little routines. There are three main candidates in this market and the choice will depend on the intended usage.

If you get the Commodore CP/M utilities pack, this contains the Digital Research MAC and R/MAC assemblers. These are Intel 8080 Assemblers and can be used to write Z80 programs using the Z80 macro library on the CP/M source disk. This is useful for those subroutines but not really suitable for writing large assembly language programs.

The most widely used CP/M Assembler is M80 by Microsoft. This has the advantage that you can choose whether to use Z80 or 8080 instructions, which can be useful when you want to make use of library routines. This is a very comprehensive package including a linker, librarian and cross-reference utility. On the negative side it uses mainly Intel Pseudo-ops and at around 100K it will rather expense.

At about half the price Hiro's DEV/PACK is a nice Z80 Macro Assembler package. This is the general

up screen of that very popular Spectrum assembler package and has the big bonus of a neat class full of notes editor. This supports Wordstar commands as default, but you can redefine them how you like. The second program is GEN80 the assembler, which has a powerful MACRO facility and produces COM file formats. If you have runtime problems then you load up MDW80 a powerful front panel debugger which allows you to see just what's happening. A first class package at a very reasonable price.

## BASIC

CP/M gives you a good opportunity to come to grips with more sophisticated programming languages but those who wish to remain faithful to the old war horse are well catered for.

If you prefer an interpreter to a Compiler Microsoft BASIC can be worth a look. This is essentially the same BASIC as used in the Amstrad but adapted for CP/M. For some reason Amstrad versions have more features than others but cost about half the price and this should make or less certain that it is little used on other systems.

A more obvious choice therefore might be M-BASIC from Microsoft, also using the Commodore BASIC Fortran-ish, this version is much more comprehensive than BASIC 3.0, but you should have few problems adapting. This one will be rather an expensive package and looks overdue for a price cut. Watch out for package deals with MD, if you are interested in both. The main advantage is the large quantity of existing software in this dialect.

C-BASIC Digital Researches Commercial BASIC also has large libraries of existing software. It has some useful facilities, but is generally rather lacking in features. Teletext on both interpreters and full compilers are sold. A budget priced version of the compiler for the Amstrad is now available but it is generally regarded as a fairly minor achievement in E-BASIC. This is supposedly quite similar to M-BASIC but has some new extensions such as labelled GOTO and GOSUB, automatic indenting and variable precision for floating point arithmetic. It also provides some new user facilities like those in Turbo Pascal and with very fast benchmarks.

and a price tag of around 175 looks the pick of the bunch.

## Pascal

If you are thinking of moving on from BASIC Pascal is the logical choice and CP/M gives you the choice of some really top class products.

If you are an ICFPU member (and you really should be if you are reading Britain's only serious Commodore Magazine!) then you can get RT Pascal for the price of an empty disk and postage. Ask for data CL3 & CL4. I know nothing about the compiler but you can't guarantee it the price.

The compiler by which most others are now judged is Borland's Turbo Pascal. This sets new standards of performance, usability and price when it was released and the opposition has only recently started to catch up. It is often criticised for its very un-standard Pascal extensions (but it is "standard extension"), but about half a million satisfied users will tell you that this gives you a real "do anything" high level language system. Unlike many Pascals, it also has adequate provision for most scientific work. If you have around 250K you can't go far wrong with Turbo.

A good low cost alternative is Pascal III from Harlot. This considerably uses the Pascal speed maker but lacks so many of the floating point operations. The latest version is packaged with ED80 and achieves much of the user friendliness of Turbo Pascal. At 140 this is a good package for the beginner.

Two other compilers should also be mentioned in this review. DR's MT Pascal is a very good compiler with extensive CP/M libraries as evidence but low cost versions have only as yet appeared for the Amstrad. Parady of course will meet on the full 500 standard Progress Pascal, it is not a pity that they will probably have to call their 128 to help it.

## C

C is the high level language favoured by assembly language programmers, who are forced to use a high level language as it allows you to continue writing unmodifiable programs. To be fast C is modified for systems software. Most CP/M compilers for C fall into

the category of "very expensive" BASIC, for example will get you back over 100 and with support, integer arithmetic. For floating point capability the choice lies between A2TSC C (approx. 1000) or ECO C which is depressingly slow, but a relative bargain at about 130. For systems work of course floating point is not essential and Harlot's offering at around 140 should start a more lively although the performance is not that exciting to say the least.

## Modular 2

This is another language from Nicholas Wirth, the author of Pascal and it quite similar to ADA, but it is much easier to compile. If you can live with a language in which FRED is not very good and Fred are still different you should find it is very easy to learn lots of your old programs. Used routinely the case of a compiler used to be a deterring, but you can get a basic FTL Modular-2 compiler for 150.

With unusually good floating point precision and consistent benchmarks, this product seems destined to finally dislodge Turbo Pascal from the top compiler spot. One word of warning, however, while Modular-2 is a very good language to learn it cannot be recommended to those with no previous Pascal experience as good textbooks are very expensive.

## Fortran & COBOL

These very old languages cannot be recommended unless you are there already. Fortran is still useful for scientific applications and at about 140 Nevada Fortran is good value. There is a similarly named and priced COBOL compiler, but for any intensive applications DBASE II is probably a better bet.

## Footnote

Suppliers: CP/M Software Ltd, Market 4 Place, Woking, Surrey, Surrey GU24 0JF. Tel: 0424 51440.  
The Software People, The Old School, Goring, Guildford, Surrey GU1 1JL. Tel: 0125 718277.





# C138 PROGRAMMING

LINE	ADDRESS	OPERATION	OPERANDS	COMMENT
0000	0000	LD	R0, #0	
0001	0001	LD	R1, #0	
0002	0002	LD	R2, #0	
0003	0003	LD	R3, #0	
0004	0004	LD	R4, #0	
0005	0005	LD	R5, #0	
0006	0006	LD	R6, #0	
0007	0007	LD	R7, #0	
0008	0008	LD	R8, #0	
0009	0009	LD	R9, #0	
0010	0010	LD	R10, #0	
0011	0011	LD	R11, #0	
0012	0012	LD	R12, #0	
0013	0013	LD	R13, #0	
0014	0014	LD	R14, #0	
0015	0015	LD	R15, #0	
0016	0016	LD	R16, #0	
0017	0017	LD	R17, #0	
0018	0018	LD	R18, #0	
0019	0019	LD	R19, #0	
0020	0020	LD	R20, #0	
0021	0021	LD	R21, #0	
0022	0022	LD	R22, #0	
0023	0023	LD	R23, #0	
0024	0024	LD	R24, #0	
0025	0025	LD	R25, #0	
0026	0026	LD	R26, #0	
0027	0027	LD	R27, #0	
0028	0028	LD	R28, #0	
0029	0029	LD	R29, #0	
0030	0030	LD	R30, #0	
0031	0031	LD	R31, #0	
0032	0032	LD	R32, #0	
0033	0033	LD	R33, #0	
0034	0034	LD	R34, #0	
0035	0035	LD	R35, #0	
0036	0036	LD	R36, #0	
0037	0037	LD	R37, #0	
0038	0038	LD	R38, #0	
0039	0039	LD	R39, #0	
0040	0040	LD	R40, #0	
0041	0041	LD	R41, #0	
0042	0042	LD	R42, #0	
0043	0043	LD	R43, #0	
0044	0044	LD	R44, #0	
0045	0045	LD	R45, #0	
0046	0046	LD	R46, #0	
0047	0047	LD	R47, #0	
0048	0048	LD	R48, #0	
0049	0049	LD	R49, #0	
0050	0050	LD	R50, #0	
0051	0051	LD	R51, #0	
0052	0052	LD	R52, #0	
0053	0053	LD	R53, #0	
0054	0054	LD	R54, #0	
0055	0055	LD	R55, #0	
0056	0056	LD	R56, #0	
0057	0057	LD	R57, #0	
0058	0058	LD	R58, #0	
0059	0059	LD	R59, #0	
0060	0060	LD	R60, #0	
0061	0061	LD	R61, #0	
0062	0062	LD	R62, #0	
0063	0063	LD	R63, #0	
0064	0064	LD	R64, #0	
0065	0065	LD	R65, #0	
0066	0066	LD	R66, #0	
0067	0067	LD	R67, #0	
0068	0068	LD	R68, #0	
0069	0069	LD	R69, #0	
0070	0070	LD	R70, #0	
0071	0071	LD	R71, #0	
0072	0072	LD	R72, #0	
0073	0073	LD	R73, #0	
0074	0074	LD	R74, #0	
0075	0075	LD	R75, #0	
0076	0076	LD	R76, #0	
0077	0077	LD	R77, #0	
0078	0078	LD	R78, #0	
0079	0079	LD	R79, #0	
0080	0080	LD	R80, #0	
0081	0081	LD	R81, #0	
0082	0082	LD	R82, #0	
0083	0083	LD	R83, #0	
0084	0084	LD	R84, #0	
0085	0085	LD	R85, #0	
0086	0086	LD	R86, #0	
0087	0087	LD	R87, #0	
0088	0088	LD	R88, #0	
0089	0089	LD	R89, #0	
0090	0090	LD	R90, #0	
0091	0091	LD	R91, #0	
0092	0092	LD	R92, #0	
0093	0093	LD	R93, #0	
0094	0094	LD	R94, #0	
0095	0095	LD	R95, #0	
0096	0096	LD	R96, #0	
0097	0097	LD	R97, #0	
0098	0098	LD	R98, #0	
0099	0099	LD	R99, #0	

LINE	ADDRESS	OPERATION	OPERANDS	COMMENT
0100	0100	LD	R100, #0	
0101	0101	LD	R101, #0	
0102	0102	LD	R102, #0	
0103	0103	LD	R103, #0	
0104	0104	LD	R104, #0	
0105	0105	LD	R105, #0	
0106	0106	LD	R106, #0	
0107	0107	LD	R107, #0	
0108	0108	LD	R108, #0	
0109	0109	LD	R109, #0	
0110	0110	LD	R110, #0	
0111	0111	LD	R111, #0	
0112	0112	LD	R112, #0	
0113	0113	LD	R113, #0	
0114	0114	LD	R114, #0	
0115	0115	LD	R115, #0	
0116	0116	LD	R116, #0	
0117	0117	LD	R117, #0	
0118	0118	LD	R118, #0	
0119	0119	LD	R119, #0	
0120	0120	LD	R120, #0	
0121	0121	LD	R121, #0	
0122	0122	LD	R122, #0	
0123	0123	LD	R123, #0	
0124	0124	LD	R124, #0	
0125	0125	LD	R125, #0	
0126	0126	LD	R126, #0	
0127	0127	LD	R127, #0	
0128	0128	LD	R128, #0	
0129	0129	LD	R129, #0	
0130	0130	LD	R130, #0	
0131	0131	LD	R131, #0	
0132	0132	LD	R132, #0	
0133	0133	LD	R133, #0	
0134	0134	LD	R134, #0	
0135	0135	LD	R135, #0	
0136	0136	LD	R136, #0	
0137	0137	LD	R137, #0	
0138	0138	LD	R138, #0	
0139	0139	LD	R139, #0	
0140	0140	LD	R140, #0	
0141	0141	LD	R141, #0	
0142	0142	LD	R142, #0	
0143	0143	LD	R143, #0	
0144	0144	LD	R144, #0	
0145	0145	LD	R145, #0	
0146	0146	LD	R146, #0	
0147	0147	LD	R147, #0	
0148	0148	LD	R148, #0	
0149	0149	LD	R149, #0	
0150	0150	LD	R150, #0	
0151	0151	LD	R151, #0	
0152	0152	LD	R152, #0	
0153	0153	LD	R153, #0	
0154	0154	LD	R154, #0	
0155	0155	LD	R155, #0	
0156	0156	LD	R156, #0	
0157	0157	LD	R157, #0	
0158	0158	LD	R158, #0	
0159	0159	LD	R159, #0	
0160	0160	LD	R160, #0	
0161	0161	LD	R161, #0	
0162	0162	LD	R162, #0	
0163	0163	LD	R163, #0	
0164	0164	LD	R164, #0	
0165	0165	LD	R165, #0	
0166	0166	LD	R166, #0	
0167	0167	LD	R167, #0	
0168	0168	LD	R168, #0	
0169	0169	LD	R169, #0	
0170	0170	LD	R170, #0	
0171	0171	LD	R171, #0	
0172	0172	LD	R172, #0	
0173	0173	LD	R173, #0	
0174	0174	LD	R174, #0	
0175	0175	LD	R175, #0	
0176	0176	LD	R176, #0	
0177	0177	LD	R177, #0	
0178	0178	LD	R178, #0	
0179	0179	LD	R179, #0	
0180	0180	LD	R180, #0	
0181	0181	LD	R181, #0	
0182	0182	LD	R182, #0	
0183	0183	LD	R183, #0	
0184	0184	LD	R184, #0	
0185	0185	LD	R185, #0	
0186	0186	LD	R186, #0	
0187	0187	LD	R187, #0	
0188	0188	LD	R188, #0	
0189	0189	LD	R189, #0	
0190	0190	LD	R190, #0	
0191	0191	LD	R191, #0	
0192	0192	LD	R192, #0	
0193	0193	LD	R193, #0	
0194	0194	LD	R194, #0	
0195	0195	LD	R195, #0	
0196	0196	LD	R196, #0	
0197	0197	LD	R197, #0	
0198	0198	LD	R198, #0	
0199	0199	LD	R199, #0	





on a ribbon, the fundamental tone has to follow the other notes while the other notes are also playing a tone or series of notes, all at the same time.

Since it is these fundamental frequencies that are being modulated, the only note that we must obey is the frequency of the notes being played. In some three (ascending) systems, there is between two notes one and three that is lower or equal to those being played by voice and otherwise not very much happens. You can try using higher frequencies if you like, and indeed you are encouraged to do so even as we've seen, the only way of getting the best out of the SID chips is to mess about with the control registers and see what happens. However, there must be some notes before practice, so let's take a look at the registers being affected by modulation.

### Bits of Information

We saw with ring modulation that the registers in question were those used to determine the waveform of the three notes and that these registers were multi-purpose ones. (Hacker's word here is to "alter the third function of those registers") Yes, need to believe we'll never be accustomed to waveform and ring modulation, they also look after synchronization.

The actually makes quite a bit of sense from the point of view of the design of the chips, since synchronization, like ring modulation, can take place on or off, and only one bit is required to do that. There are only four waveforms that can be selected, in fact two are needed, and these waveforms can be either on or off, requiring one further bit. Consequently there remain a pair but left over to do nothing, redundancy and a minimal waste. Let's look at the chip to see precisely what it is that we're going to be altering.

```
10 00 002 000 010 000 000 000
00 000 000 000 000 000 000 000
00 000 000 000 000 000 000 000
```

The bit to keep an eye on for this note is bit one (labelled three in the bottom line of values here, since it is the third part of the register that we're going to be looking at. Rather than ring modulation, synchronization can be either on or off and each of the three registers works in exactly the same way.

To start off, we need to alter bit one by using any one of these: `V=54272` and altering just the only word `POKE V+4 POKE V+4` OR `2`. The latter only does that bit is altered leaving everything else as it was before we came along. Since, for the purpose of our example program we want to synchronize voice one with respect to voice three, this will be fine. Voice three can carry on in its own sweet way, with no great consequences from us. Let us deal of all set up the start of the program in our usual way.

```
3 FOR I=0 TO 24 POKE 54272+I
NEXT I
40 V=54272
15 POKE V+4: I=1
20 POKE V+5: POKE V+6: I=2
21 POKE V+7: POKE V+11: I=3
22 POKE V+14: POKE V+20: I=5
23 FOR I=0 TO 2 POKE V+17+I: I=I+1: NEXT I
```

The sets up our three voices to have different waveforms and to be synchronized with each other. This, of course, is optional, as Euler himself involves everything playing at a lower note than everything else which just cannot be achieved, but at least it will make a notable noise and you'll be able to hear to the result!

Now we need the data for the Tabular Bell-riff and as any fan of Mike Oldfield will know, the notes we need are D, E, C, D, F, G, E, F, E before going back to the start again. Fortunately for us the delays between the notes being played are quite straightforward, consisting of a standard delay of whatever length we choose and a half of that delay.

So our data statement becomes:

```
100 DATA 2465,10,2185,10,2465,10
2000 10
300 DATA 1338,40,2785,10,2000 10,
2785,60,0
```

The next line of our program can now be used to read the in and set up the high values and low value frequencies:

```
10 READ F:IF F=0 THEN
RESTORE GOTO 30
32 FH=IN(0)/256:FL=F-FH*256
34 READ DE
35 FOR I=0 TO 2
36 POKE V+I*11: FH POKE V+I*4+FL
38 FOR I=1 TO 50: I=I+1: NEXT I
40 GOTO 32
```

I think you'll agree that this program quite an unusual effect.

You might now want to try your hand at introducing chords or notes being played at different octaves, and see what the results of that might be. We cannot set get onto the synchronization, because we would need an extra knowledge of how musical intervals work and how we can combine those intervals with a synthesizer program.

And before we can do that, we also need to know something about the workings of the last major feature of the SID chip, namely the filtering registers. If you think ring modulation and sync synchronization were using multi-purpose registers, well, in the words of someone relatively famous, *You don't know anything!*

### Filtering

A much misunderstood and as a consequence often underrated aspect of the Commodore 64's music capabilities is the idea of filtering. People who have managed to master the aspect of things have produced some wonderful (and) programs over the years, but that is simply not the case of background sounds that are strongly tonal in duration and scoring capability, and you can guarantee that every successful music package sold for the Commodore 64 has had at its heart a deep working knowledge of filtering and how it works.

On the Commodore 64 we have four different types of filtering available to us. All work on the same principle, but adopt that principle for different needs depending on the type of filtering selected. One can independently filter one or all of the three voices but once filtering has been selected then any voices which are being filtered are all subject to the same type of filtering, and the same effects of filtering that type but also changing to all the voices. That is similar to the volume control, although as with that particular option, things can be programmed in such a way as to temporarily get around that limitation.

As with a number of other control registers on the SID chip, filtering is achieved by using two multi-purpose registers, and one of these is the all-synchronized volume control - register `V+34` if an octave as usual use three locations is 54272 and the variable `V` is

percentage to that value. The result we must do over with our long-held belief of simply POKEing V+24.13 to turn the volume on to maximum and POKEing V+24.0 to turn it off altogether. As we shall see, POKEing that particular register at times is more than just the volume.

But first, let's look at the five different types of filtering.

### High Pass Filter

As with all the other types, this particular effect depends on a selected frequency, which is known as the cutoff frequency. We shall see how that is selected as we proceed. Having discussed the cutoff frequency, then selecting a high pass filter means that the level of frequencies below the cutoff point are drastically reduced while all those equal to it or higher than it are passed through as normal.

Therefore a note of frequency 1000 cycles per second or better coupled with a high pass filter and a cutoff frequency of 1000 hertz, would sound rather quiet? All frequencies below 1000 hertz would be reduced and thus the note itself would be reduced until volume drops. Selecting a cutoff of about 900 hertz would, on the other hand, produce something like note sounds of just a couple frequency, with all the harmonics (triangle, sawtooth, pulse and noise) produce a variety of harmonics around the desired frequency. Selecting a filter and a cutoff frequency can therefore be used to amplify or reduce frequencies around a certain point and helps to combine more accurately a variety of musical instruments.

A high pass filter lets everything through higher than or equal to the cutoff frequency, while reducing everything lower than it.

### Low Pass Filter

This is as you might expect, the exact opposite of the high pass filter, although it operates on the same principle and will require a cutoff frequency to be set. This time, everything lower than the cutoff frequency is passed through as normal while everything higher than it is severely reduced. For example a note of frequency 1000 hertz when placed through a low pass filter using a cutoff frequency of around 1100 hertz would sound perfectly normal (well almost) while changing the cutoff

frequency to about 900 hertz would severely limit the sound.

A low pass filter lets through everything lower than or equal to the cutoff frequency, while reducing everything higher than it.

### Band Pass Filter

This would be something that would be used as a television, allowing only certain programs to be played and getting rid of anything extraneous? On the Commodore 64, however, a band pass filter allows only a narrow band of frequencies to be placed around the cutoff frequency, while rejecting everything below or above that band. Therefore a note of 1000 hertz placed through a band pass filter with a cutoff frequency of 1000 hertz would sound less "full" than normal since all the usual harmonics have been severely reduced, leaving just a narrow band of frequencies to get through.

In other words, a band pass filter lets through everything in a band of frequencies around the cutoff frequency and reduces anything either higher or lower than the band.

### Noise Reject Filter

The complete opposite of a band pass filter, and strictly speaking one that doesn't exist on the Commodore 64. However, by combining the already mentioned high pass and low pass filters we can produce this sort of extra filter. This time, if we select a noise reject filter and our usual cutoff frequency, everything within a narrow band centered around the cutoff frequency is rejected while everything outside it passed through as normal. This has the effect of cutting down on the main "sound" of a note while only playing the "surround" of the instrument.

To combine a noise reject filter means rejecting everything in a narrow band or notch, around the cutoff frequency while letting through everything outside that notch. How does one select these various filters?

### Voice and Filter Selection

Let us first of all consider the different types of filter, and the best way to do this is by looking at the register V+24

```
128 064 072 076 080 084 088 091
097 105 109 114 117 120 123 126
```

Bits two to three of the registers are used to control the volume and bits four to seven to have the values 0 to 15. The four is used to select a low pass filter so POKE V+24:PF=0/7+140:0/8:16 turns on a low pass filter while keeping the volume at its normal level. Or, if you like, POKE V+24:0 sets a low pass filter with a maximum volume.

Bit five is used to select a band pass filter, so that POKE V+24:47 can be used to select that filter while keeping the volume at its maximum level.

Bit six is used to select a high pass filter so that POKE V+24:79 can be chosen to switch a high pass filter on while all the others off and again keep the volume at maximum level.

The seven is used to turn all the filters off - so POKE V+24:14:0 can be used, that, like one more keeps the volume at maximum.

Finally our "hybrid" filter is chosen by combining a high pass with a low pass filter for the noise reject filter so to see that we must POKE V+24:16+110:15 or POKE V+24:95.

Having stated that out, which voice are we going to use and how, are we to select the cut-off frequency? There are three voice registers to consider now, namely V+21, V+22 and V+23. We'll look at the latter first.

```
128 064 072 076 080 084 088 091
097 105 109 114 117 120 123 126
```

We'll again be three since there are only two for an external input and we're not about to turn Four Commodore into a note of three diagrams.

Quite simply, turning on bit two will select voice one to be filtered, turning on bit one will select voice two to be filtered, and turning on bit two will select voice three to be filtered. Turning on all the bits will select all three voices to be filtered, and any combination can be chosen as you see fit.

Bits four to seven determine the filter resonance that is the amount of resonance that one can expect with respect to the cut-off frequency. Being a tone bit number it can contain any value between 0 and 15, and rather like an octaves on ADR8 it's common to think of it this way, multiplying the value on the range 0 to 12 to find out which value should really be POKE'd in there.



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These programs are available on disk

## Please Note

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# Listings

Get it right first time with our delete program system for the C64

You may have noticed that our listings are too difficult to look at. Black blocks which tend to wrap around the keyboard for a suitable graphic symbol. You may also have noticed the heavy numbers by the side of each line of the listing. This is because it's all part of our new editor and

instead of those messy graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code or mnemonic is always contained in square brackets and you'll soon learn to decipher their meanings.

For example [BA] would mean type in a Shift-A, a certain set of spaces, an asterisk's name, and [BA0] would mean a row of ten of those symbols.

[B+2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realize that [C+2] means exactly the same thing except that the Command key (bottom left of the keyboard) is held down instead of the shift key.

It goes that the spaces appear as a rectangle that will be printed as [SPC+] or equivalently [SSPC+]. Translated into English this means press the square bar twice or the letter case hold the shift key down while you do it.

A string of special characters could appear as [CTRL, N, DOWN], LEFTS BLUE, etc.

This would be achieved by holding

down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the FN key and finally hold the Command key down while pressing the number two key (C2 would of course make the computer print a brown).

Always remember that you should only have a row of graphics the colour as your string with no square brackets and no mnemonics unless something like this appears: [SS]C\*

In this case the two characters should have a space between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to the mnemonic. Then type a closing question mark (SHIFT & 2) and delete it. This puts the computer out of quotes mode. Hold down CTRL and press the number two key (RYSON) or the relevant number of reversed T's and then hold down CTRL and press zero (RYSON/0). Next type another question mark and delete it again. Now finish the line and press REV T's.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string, the number key is. This may appear when a value is needed in a calculation so that they look something like:

CC=270/178.

Ignore the square brackets and just type in a shifted apostrophe pointing arrow (ie the # symbol).

[REDACTED] START A PROGRAM	
0	000 0000 000000 0000 0000
10	00 00 00 00 00 00 00 00 00 00 00 00
20	00 00 00 00 00 00 00 00 00 00 00 00
30	00 00 00 00 00 00 00 00 00 00 00 00
40	00 00 00 00 00 00 00 00 00 00 00 00
50	00 00 00 00 00 00 00 00 00 00 00 00
60	00 00 00 00 00 00 00 00 00 00 00 00
70	00 00 00 00 00 00 00 00 00 00 00 00
80	00 00 00 00 00 00 00 00 00 00 00 00
90	00 00 00 00 00 00 00 00 00 00 00 00
A0	00 00 00 00 00 00 00 00 00 00 00 00
B0	00 00 00 00 00 00 00 00 00 00 00 00
C0	00 00 00 00 00 00 00 00 00 00 00 00
D0	00 00 00 00 00 00 00 00 00 00 00 00
E0	00 00 00 00 00 00 00 00 00 00 00 00
F0	00 00 00 00 00 00 00 00 00 00 00 00
100	00 00 00 00 00 00 00 00 00 00 00 00
110	00 00 00 00 00 00 00 00 00 00 00 00
120	00 00 00 00 00 00 00 00 00 00 00 00
130	00 00 00 00 00 00 00 00 00 00 00 00
140	00 00 00 00 00 00 00 00 00 00 00 00
150	00 00 00 00 00 00 00 00 00 00 00 00
160	00 00 00 00 00 00 00 00 00 00 00 00
170	00 00 00 00 00 00 00 00 00 00 00 00
180	00 00 00 00 00 00 00 00 00 00 00 00
190	00 00 00 00 00 00 00 00 00 00 00 00
200	00 00 00 00 00 00 00 00 00 00 00 00
210	00 00 00 00 00 00 00 00 00 00 00 00
220	00 00 00 00 00 00 00 00 00 00 00 00
230	00 00 00 00 00 00 00 00 00 00 00 00
240	00 00 00 00 00 00 00 00 00 00 00 00
250	00 00 00 00 00 00 00 00 00 00 00 00
260	00 00 00 00 00 00 00 00 00 00 00 00
270	00 00 00 00 00 00 00 00 00 00 00 00
280	00 00 00 00 00 00 00 00 00 00 00 00
290	00 00 00 00 00 00 00 00 00 00 00 00
300	00 00 00 00 00 00 00 00 00 00 00 00
310	00 00 00 00 00 00 00 00 00 00 00 00
320	00 00 00 00 00 00 00 00 00 00 00 00
330	00 00 00 00 00 00 00 00 00 00 00 00
340	00 00 00 00 00 00 00 00 00 00 00 00
350	00 00 00 00 00 00 00 00 00 00 00 00
360	00 00 00 00 00 00 00 00 00 00 00 00
370	00 00 00 00 00 00 00 00 00 00 00 00
380	00 00 00 00 00 00 00 00 00 00 00 00
390	00 00 00 00 00 00 00 00 00 00 00 00
400	00 00 00 00 00 00 00 00 00 00 00 00
410	00 00 00 00 00 00 00 00 00 00 00 00
420	00 00 00 00 00 00 00 00 00 00 00 00
430	00 00 00 00 00 00 00 00 00 00 00 00
440	00 00 00 00 00 00 00 00 00 00 00 00
450	00 00 00 00 00 00 00 00 00 00 00 00
460	00 00 00 00 00 00 00 00 00 00 00 00
470	00 00 00 00 00 00 00 00 00 00 00 00
480	00 00 00 00 00 00 00 00 00 00 00 00
490	00 00 00 00 00 00 00 00 00 00 00 00
500	00 00 00 00 00 00 00 00 00 00 00 00

By Eric Doyle

## Checksum Program

The hexadecimal numbers appearing at a calculator to the left of the listing should not be typed in with this program. These are merely checksum values and are there to help you get your lines right. Don't worry if you don't understand the hexadecimal system as long as you can compare two characters on the screen with the corresponding two characters in the magazine; you can use our line-checking program.

Type in the Checksum Program, make sure that you do not make any mistakes and save it to tape or disk

immediately because it will be used with most of the programs and listings listings appearing in Your Commodore.

















At the start of each programming session, load Checksum and run it. The screen will have a long string of flow characters and each time you type in a line and press the RETURN key, a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't differ in one another, you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

press RETURN again.

If you want to turn off the checker simply type 'OFF' and the screen will return to the familiar blue column. You can then do whatever it was you wanted to do and if the checker is on the area where Checksum has you can go back to it with the same SYS command.

No system is foolproof but the chances of low errors, carelessness and many of the listings are presented in lower case. To test your computer to lower case mode press the Commodore key and the SHIFT key at the same time. ☺

Mnemonic	Symbol	Keypress
[RIGHT]		CRSR left/right
[LEFT]		SHIFT & CRSR left/right
[DOWN]		CRSR up/down
[UP]		SHIFT & CRSR up/down
[F1]		F1 key
[F7]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F4]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[BASON]		CTRL & 9
[BAsOFF]		CTRL & 9

Mnemonic	Symbol	Keypress
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LBARROW]		←
[RBARROW]		→
[F1]		SHIFT & [
[INST]		SHIFT & INST/DEL
[REV T]		←/REV
[Clear]		CBM ←/BAsT
[Name]		SHIFT + Name







LISTINGS

73	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
74	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
75	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
76	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
77	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
78	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
79	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
80	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
81	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
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88	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
89	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
90	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
91	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
92	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
93	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
94	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
95	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
96	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
97	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
98	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
99	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7
100	1000	85 78 30 85 82 30 85 80 85	141 85 80 141 85 80 140 7













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MAKING GEOS BRITISH



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**Bug Finder**

We'd like to reward our readers that do use a Bug Finder service.

If you have typed in one of our programs and despite much checking, you still can't get it to run, then send us the following:

The names of your program on tape or disk.

A description of your problem.

If possible a listing of your program (on tape or other form).

A stamped self-addressed envelope for return of the program to you.

Should any of the above be missing, then we will not be able to deal with your query.

We will try to point out where to find some more errors and place an updated copy of the program back on to your tape or disk before we return it to you.

If you send a program to us as soon as it stops working, please check it several times first.

We do get a large number of queries and we must take a while for us to deal with yours personally.

Now, we can only deal with problems relating to programs published in *Home Commodore*.

**Program Submissions**

Due to the slowness of our software evaluator some people may be experiencing a delay in getting their replies regarding submissions. We are trying to clear the backlog of programs as quickly as we can but this is taking some time. This backlog also affects Bug Finders and Letters.

We apologise for the delay and would ask that you would bear with us while the backlog is cleared.

The publication of letters has also been halted because of the software backlog. We will be bringing you more short programs and tips as soon as we can.

**Commodore Where Are You?**

At the Year Commodore office we are repeatedly asked for the address and telephone number of Commodore UK. Many people after referring to their computer manuals believe them to be based in Corby.

The Commodore plant at Corby was closed down some time ago. Reproduced here you will find the correct address for Commodore UK.

We suggest that you write the correct address on the front of your computer manual for future reference.

Commodore Business Machines (UK)  
Commodore, Hirst,  
The Smeethack  
Carpenter Road  
Mansfield  
Berk. N10 7NA

As the Year Commodore office we receive hundreds of letters from readers every month. We do try and answer each individually but sometimes this is impossible due to pressure of work. If you have written to us and not received a reply we apologise for this but we cannot promise to reply to every one as most are ignored. If you feel that your question or letter really needs an answer, then inclusion of an S.A.S. will guarantee a reply, although this may still take time to arrive.

# Puzzle Corner



**N**ow it's our chance to put some computers down for a while, and use your brain with a puzzle.

We would like to see any of you to complete:

Solve some puzzles in the *Home Commodore*, Editors address and send a stamped cheque of winning (from a Year Commodore magazine) to: *Home Commodore*, disk, books.

The final correct entry to each puzzle drawn out of the hat on Friday 29th April 1986 will win the holder of their choice, please state your preference when entering the competition. Entries should be to: *Home Commodore*, Puzzle Corner, 1 Golden Square, London W1R 5AB.

1. Your mother has just killed a dog, does that make her a vegetarian or a right winger, with just this one?

2. How many triangles are there in the diagram?

3. One of our advertisers (counted 75) said he would know for being one of the greatest people around. How many sticky bombs do you think he can set on an opponent's watch?

4. A Year Commodore reader has a rare Apple II game which will only run on Prodos. He says all the market but can't run. He is stopped by six different people (each person has a ball in their eye) but one egg hits the target and he can only win. How many eggs did he start off with?





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